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EPA Utility FGD Survey February-March 1978

PEDCo-Environmental, Inc, Cincinnati, OH

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Research Triangle Park NC 27711

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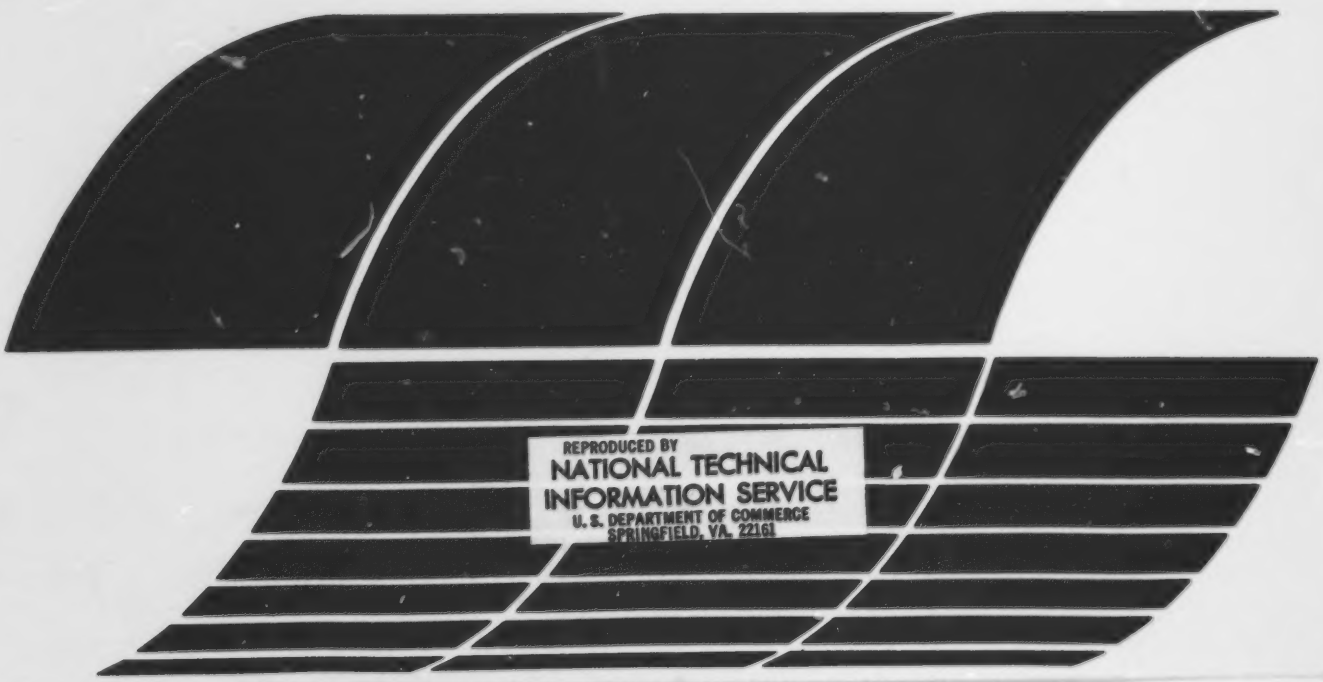
EPA Utility FGD Survey: February - March 1978

Interagency Energy/Environment R&D Program Report



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EPA Utility FGD Survey: February - March 1978

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Office of Research and Development
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This report is the first of five supplementary issues to the December 1977 - January 1978 report. Supplementary issues are cumulative, so that it is necessary only to retain the latest issue and the December 1977 - January 1978 report (EPA-600/7-78-051a).

Initial distribution of the report (generally, one copy per company) is limited to organizations and individuals indicating a specific interest in the field of FGD technology. Additional copies of this report and succeeding issues can be purchased from National Technical Information Service, Springfield, Virginia 22151.

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EXECUTIVE SUMMARY

This report is prepared every other month by PEDCo Environmental, Inc., under a contract to the Industrial Environmental Research Laboratory/RTP and the Division of Stationary Source Enforcement of the U.S. Environmental Protection Agency. Table 1 summarizes the current status of the FGD systems addressed in this 2-month period.

Table I

NUMBER OF TOTAL MW OF FGD SYSTEMS

Status	No. of units	MW
Operational	34	11,508
Under construction	42	17,741
Planning:		
Contract awarded	17	8,983
Letter of Intent	3	892
Requesting/evaluating bids	4	1,930
Considering only FGD systems	32	15,425
TOTAL	132	56,479

Table II (page ix) summarizes the individual units that changed status during the report period.

The present total power-generating capability of the electric utility industry in the United States is approximately 532.4 GW[a]. Of this total, approximately 250 GW[b], representing 47 percent of the total, are generated by coal. As indicated in Table I, 34 FGD-equipped coal-fired units, rep-

resenting 11,508 MW of power capability, are now in service. Thus, a little over 2 percent of the total utility power-generating and a little over 4 percent of the utility coal-fired capacity are controlled by FGD. By 1986, the projected total power-generating capability of the electric utility industry in the United States will be 812.7 GW[a]. This represents an increase of 53 percent over the present total and includes retirements of older units (0.4 percent annual average based on year-end power-generation capability). Of the 1986 total, approximately 363.2 GW[a,b,c], representing 45 percent of the total, will be generated by coal. As indicated in Table I, 132 FGD equipped coal-fired units, representing 56,479 MW of power capacity, are scheduled for operation by 1986. Thus, approximately seven percent of the projected total generating capacity and 16 percent of the projected coal-fired capacity will be controlled by FGD by the end of 1986.

Arizona Public Service reported that Cholla 1 was in service throughout the month of February with the A-module logging 636 and B-module 564 hours of operation. The boiler operated 642 hours in February. Reliability index values for Cholla 1 were 100 percent for both modules.

Basin Electric Power announced that construction has commenced on Laramie River 1 and 2. Start-up dates are April and October 1980, respectively.

The Board of Municipal Utilities, Sikeston, Missouri, reported that construction began on March 27 at Sikestone Power Station. The actual commercial start-up of FGD operations has been rescheduled for June 1981.

Columbus and Southern Ohio Electric reported that Conesville 6 is in its preoperational phase with full commercial operation expected in the near future.

Boilers 1, 2, and 4 are now completely connected to the FGD systems at Duquesne Light's Elrama power station. The utility reported that Boiler 3 of this 4-boiler system will be connected into the FGD system in late April after completion of an extensive overhaul.

Hoosier Coop announced that a contract has been awarded to Mitsubishi Heavy Industries for the installation of two, 4-module limestone FGD systems on Merom 1 and 2. The units are scheduled to start up in December 1980 and October 1981, respectively.

Kansas City Power and Light Company reported that LaCygne 1 had a total system availability of 94 percent in February and 93 percent in March. Boiler hours were 578 and 741 for February and March. Boiler load factors were 58 and 82 percent for the two months, respectively.

Kansas Power and Light reported that Lawrence 5 was taken out of service on March 20 to tie in the new 2-module rod scrubber and spray tower absorber system. This new system replaces the original 8-module marble-bed scrubber-absorber system which was first placed in service in November 1971 and accumulated over 23,000 hours of operation.

A contract has been awarded to Babcock and Wilcox, for a new limestone FGD system at McIntosh 3 of Lakeland Department of Electric and Water Utilities. The utility announced that construction should begin in January 1979. Unit start-up is scheduled for October 1981.

The FGD system on the 178-MW Cane Run 4 of Louisville Gas and Electric (LG&E), was out of service through February and most of March as a result of the coal shortage and an unavailability of reagent. LG&E announced the start-up of the FGD system on the 183-MW Cane Run 5 during the report period.

Minnesota Power and Light reported that Clay Boswell 4 is now under construction with a start-up scheduled for January 1980 and full commercial operation by May 1980.

Nevada Power reported operability index values for the Reid Gardner 2 FGD system of 92 and 89 percent for February and March, respectively. The Reid Gardner 3 FGD system demonstrated operability values of 95 and 97 percent for February and March, respectively.

Northern States Power reported that the Sherburne No. 1 FGD system was available 92 percent during the period. The No. 2 FGD system was available 92 percent in February and 97 percent in March.

Pennsylvania Power Company reported that Bruce Mansfield 1 continued to operate at half load during December. An availability index of 97 percent was demonstrated on the 3-module portion of the FGD system. During January, a total of four modules were out of service, and the two remaining modules achieved a 100 percent availability. Running at half load again in February, the availability of the three operating modules was 74 percent. Downtime was attributed to the coal strike and associated boiler problems and

scrubber related repairs and maintenance. Pennsylvania Power also reported Bruce Mansfield 2 achieved availability index values of 93, 85, and 89 percent for the months of December, January, and February, respectively.

The Public Service of New Mexico announced that initial sulfur dioxide absorption began April 8, 1978, for San Juan 1. Initial FGD operations were conducted with two absorption towers running continuously. A third absorber is to be brought on line later. Three absorbers are needed for full load operation; a fourth is included as a spare. The regeneration mode will commence in late April. The unit is in compliance at this time with respect to SO_2. Compliance testing may take place as early as the first week of May 1978. Full commercial operation of the unit is expected by late June. The utility reported that construction has begun on San Juan 3. San Juan 3 is expected to start up in January 1979. San Juan 2 is scheduled to start up by early July.

Construction has commenced on the limestone FGD systems at Coronado 1 and 2 of the Salt River Project. The utility reported that the two 350-MW units are scheduled to start up in April 1979 and 1980, respectively.

South Carolina Public Service Authority announced that a contract has been awarded to Babcock and Wilcox for the installation of an FGD system on Winyah 3. Construction of the system should begin this June. The facility is expected to start up in May 1980.

Table 2. SUMMARY OF CHANGES: FGD SUMMARY REPORT, FEBRUARY-MARCH 1978

FGD status report	Operational		Under construction		Contract awarded		Letter of intent		Requesting/ evaluating bids		Considering FGD		Total	
	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW
1/31/78	31	10,550	38	15,664	20	10,415	1	865	6	2,660	33	15,525	131	55,679
Basin Electric Power Coop Antelope Valley No. 1									+1	450	-1	450		
Basin Electric Power Coop Antelope Valley No. 2									+1	450	-1	450		
Basin Electric Power Coop Laramie River No. 1			+1	550	-1	550								
Basin Electric Power Coop Laramie River No. 2			+1	550	-1	550								
Board of Municipal Utilities Sikeston Power Station			+1	235	-1	235								
Columbus & Southern Ohio Electric Conesville No. 6	+1	400	-1	400										
General Public Utilities Colorado No. 1											+1	800	+1	800
Hoosier Cooperative Merom No. 1					+1	490			-1	490				
Hoosier Cooperative Merom No. 2					+1	490			-1	490				
Lakeland Utility McIntosch Power Plant No. 3					+1	350			-1	350				
Louisville Gas & Electric Cane Run No. 5	+1	183	-1	183										
Minnesota Power and Light Clay Boswell No. 4			+1	500	-1	500								
Public Service Co. of New Mexico San Juan No. 1	+1	375	-1	375										
Public Service Co. of New Mexico San Juan No. 3			+1	500			-1	500						
Salt River Project Coronado No. 1			+1	350	-1	350								
Salt River Project Coronado No. 2			+1	350	-1	350								
South Carolina Public Service Winyah No. 3					+1	300			-1	300				
Wisconsin Power & Light Columbia No. 2					-1	527	+1	527						
TOTALS	34	11,508	42	17,741	17	8,983	1	892	4	1,930	32	15,425	132	56,479

Table 3. PERFORMANCE OF OPERATIONAL UNITS DURING FEBRUARY-MARCH PERIOD

Plant	FGD system design capacity	FGD unit on-line during period[a]	No information for this period	Shutdown throughout period	FGD system availability, %[b]		FGD system operability, %[b]		FGD system reliability, %[b]		FGD system utilization, %[b]	
					Feb	Mar	Feb	Mar	Feb	Mar	Feb	Mar
Cholla 1	115	115							94	94		
Conesville 5	400	400			0	20	0	59	0	18	0	18
Conesville 6	400	400										
Elrama	510	310		200								
Phillips	410	410										
Petersburg 3	530			530								
Hawthorn 3	140	140			25	56	10	100			02	55
Hawthorn 4	100	100			10	63	100	100			29	63
La Cygne 1	820	820			94	93						
Lawrence 4	125	125										
Lawrence 5	400	400										
Green River 1, 2, and 3	64			64	100[c]	100[c]	0	0	0	0	0	0
Cane Run 4	178	178			0	34					0	34
Cane Run 5	183	183										
Paddys Run 6	65			65								
M. R. Young 2	450	450										
Colstrip 1	360		360									
Colstrip 2	360		360									
Reid Gardner 1	125	125			97	28	75	58	94	58	43	28
Reid Gardner 2	125	125			93	80	92	89	93	97	87	80
Reid Gardner 3	125	125			96	97	95	97	95	97	88	97

(continued)

Table 3. (continued)

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Plant	FGD system design capacity	FGD unit on-line during period[a]	No information for this period	Shutdown throughout period	FGD system availability, %[b]		FGD system operability, %[b]		FGD system reliability, %[b]		FGD system utilization, %[b]	
					Feb	Mar	Feb	Mar	Feb	Mar	Feb	Mar
D.H. Mitchell 11	115		115									
Sherburne 1	710	710			92	92						
Sherburne 2	710	710			92	97						
Bruce Mansfield 1	825	410		415								
Bruce Mansfield 2	825	825			89		75				75	
Eddystone 1A	120			120								
San Juan 1	375	375										
Winyah 2	280	280										
Southwest 1	200			200								
Shawnee 10A	10	10										
Shawnee 10B	10	10										
Widows Creek 8	550	550			55		54		61		47	
Martin Lake 1	793	793										
TOTAL	11,508	9,079	835	1,594								

[a] This category includes the flue gas capacity being handled by the FGD system at least part of the time during the report period.

[b] The percent figures listed are average values for all system scrubbing trains during the period in question.

[c] The FGD system was available almost 100% although the system was shutdown due to a frozen slurry line. The utility elected not to utilize its manpower for FGD system work in order to concentrate maintenance crews on power generation throughout the duration of emergency conditions.

REFERENCES FOR EXECUTIVE SUMMARY

a Sixth Biennial Survey of Power Equipment Requirements of the U.S. Electric Utility Industry: 1977-1986, sponsored by the Power Equipment Div., National Electrical Manufacturers Association.

b Policy Testing Model for Electric Utilities, Exhibit II-3, Developed by Temple, Barker, and Sloane, Inc.

c 12th Annual Power Engineering Survey, Power Engineering, April 1978.

SECTION 1
SUMMARY LIST OF FGD SYSTEMS

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FGD STATUS REPORT 05/78

COMPANY NAME	UNIT NAME	START UP DATE	STATUS	REG CLASS
ALABAMA ELECTRIC COOP	TOMBIGBEE 2	6-78	2	A
ALABAMA ELECTRIC COOP	TOMBIGBEE 3	6-79	2	A
ALLEGHENY POWER SYSTEM	PLEASANTS 1	3-79	2	A
ALLEGHENY POWER SYSTEM	PLEASANTS 2	3-80	2	A
ARIZONA ELECTRIC POWER COOP	APACHE NO 2	6-78	2	B
ARIZONA ELECTRIC POWER COOP	APACHE NO 3	4-79	2	B
ARIZONA PUBLIC SERVICE	CHOLLA NO 1	10-73	1	B
ARIZONA PUBLIC SERVICE	CHOLLA NO 2	6-76	2	B
ARIZONA PUBLIC SERVICE	CHOLLA NO. 4	6-80	3	E
ARIZONA PUBLIC SERVICE	FOUR CORNERS NO. 1	0- 0	6	B
ARIZONA PUBLIC SERVICE	FOUR CORNERS NO. 2	0- 0	6	B
ARIZONA PUBLIC SERVICE	FOUR CORNERS NO. 3	0- 0	6	B
ARIZONA PUBLIC SERVICE	FOUR CORNERS NO. 4	0- 0	6	B
ARIZONA PUBLIC SERVICE	FOUR CORNERS NO. 5	0- 0	6	B
BASIN ELECTRIC POWER COOP	ANTELOPE VALLEY NO. 1	0-81	5	B
BASIN ELECTRIC POWER COOP	ANTELOPE VALLEY NO. 2	0-83	5	B
BASIN ELECTRIC POWER COOP	LARAMIE RIVER NO. 1	4-80	2	B
BASIN ELECTRIC POWER COOP	LARAMIE RIVER NO. 2	10-80	2	B
BASIN ELECTRIC POWER COOP	LARAMIE RIVER NO. 3	4-82	6	B
BIG RIVERS ELECTRIC COOP CORP.	REID NO. 2	12-79	2	A
BIG RIVERS ELECTRIC COOP CORP.	REID NO. 3	12-80	2	A
BOARD OF MUNICIPAL UTILITIES	SIKESTON POWER STATION	6-81	2	A
BRAZOS ELECTRIC POWER COOP	SAN MIGUEL NO. 1	6-80	2	A
CENTRAL ILLINOIS LIGHT CO.	DUCK CREEK NO. 1	8-78	2	A
CENTRAL ILLINOIS LIGHT CO.	DUCK CREEK NO.2	1-82	6	A
CENTRAL ILLINOIS PUBLIC SERV	NEWTON NO.1	11-79	2	A
CENTRAL MAINE POWER CO.	SEARS ISLAND NO. 1	11-86	6	A
CINCINNATI GAS & ELECTRIC CO.	EAST BEND NO 2	1-81	3	A
COLORADO UTE ELECTRIC ASSN.	CRAIG NO. 1	3-79	2	B
COLORADO UTE ELECTRIC ASSN.	CRAIG NO. 2	3-79	2	B
COLUMBUS & SOUTHERN OHIO ELEC.	CONESVILLE NO 5	1-77	1	B
COLUMBUS & SOUTHERN OHIO ELEC.	CONESVILLE NO 6	4-78	1	B
COLUMBUS & SOUTHERN OHIO ELEC.	POSTON NO. 5	0-81	6	B
COLUMBUS & SOUTHERN OHIO ELEC.	P STON NO. 6	0-83	6	B
COMMONWEALTH EDISON	POWERTON NO. 51	12-79	2	C
COOPERATIVE POWER ASSOCIATION	COAL CREEK NO. 1	2-79	2	A
COOPERATIVE POWER ASSOCIATION	COAL CREEK NO. 2	11-79	2	A
DELMARVA POWER CO.	DELAWARE CITY NOS. 1 2 & 3	6-80	2	C
DUQUESNE LIGHT	ELRAMA POWER STATION	10-75	1	B
DUQUESNE LIGHT	PHILLIPS POWER STATION	7-73	1	B
EASTERN KENTUCKY POWER COOP	SPURLOCK GENERATING PLANT NO.2	3-80	5	A
GENERAL PUBLIC UTILITIES	CONO NO.1	5-87	6	A
GENERAL PUBLIC UTILITIES	SEWARD NO.7	5-84	7	A
GULF POWER CO.	CHIST NO. 4 AND NO. 5	0-78	7	B
GULF POWER CO.	CHIST NO. 6 AND NO. 7	0-80	7	B
GULF POWER CO.	LANSING SMITH NO. 1 AND NO. 2	0-80	7	B
HOOSIER COOPERATIVE	MEROM NO. 1	12-80	3	A
HOOSIER COOPERATIVE	MEROM NO. 2	10-81	3	A
INDIANAPOLIS POWER & LIGHT CO.	PETERSBURG NO 3	10-77	1	A
INDIANAPOLIS POWER & LIGHT CO.	PETERSBURG NO 4	4-82	5	A
KANSAS CITY POWER & LIGHT	HAWTHORN NO. 3	11-72	1	B
KANSAS CITY POWER & LIGHT	HAWTHORN NO. 4	8-72	1	B
KANSAS CITY POWER & LIGHT	LA CYGNE NO 1	2-73	1	C
KANSAS POWER & LIGHT	JEFFERY NO. 1	6-78	2	B
KANSAS POWER & LIGHT	JEFFERY NO. 2	6-80	2	B
KANSAS POWER & LIGHT	LAWRENCE NO 4	12-68	1	B
KANSAS POWER & LIGHT	LAWRENCE NO 5	11-71	1	B
KENTUCKY UTILITIES	GREEN RIVER NOS. 1 2 AND 3	9-75	1	C
LAKELAND UTILITIES	MCINTOSH POWER PLANT UNIT NO.3	10-81	3	A
LOUISVILLE GAS & ELECTRIC	CANE RUN NO 4	8-76	1	B

1. OPERATIONAL UNITS
2. UNITS UNDER CONSTRUCTION
3. PLANNED - CONTRACT AWARDED
4. PLANNED - LETTER OF INTENT SIGNED
5. PLANNED - REQUESTING/EVALUATING BIDS
6. CONSIDERING ONLY FGD SYSTEMS
7. CONSIDERING FGD SYSTEMS AS WELL AS ALTERNATIVE METHODS

A. BOILER CONSTRUCTED SUBJECT TO FEDERAL NSPS
B. BOILER SUBJECT TO STATE STANDARD THAT IS MORE STRINGENT THAN THE FEDERAL NSPS
C. BOILER SUBJECT TO STATE STANDARD THAT IS EQUAL TO OR LESS STRINGENT THAN NSPS
D. OTHER
E. REGULATORY CLASS UNKNOWN

SECTION 1
SUMMARY LIST OF FGD SYSTEMS

FGD STATUS REPORT 03/78

COMPANY NAME	UNIT NAME	START UP DATE	STATUS	REG CLASS
LOUISVILLE GAS & ELECTRIC	CANE RUN NO 5	12-77	1	B
LOUISVILLE GAS & ELECTRIC	CANE RUN NO 6	12-79	2	B
LOUISVILLE GAS & ELECTRIC	MILL CREEK NO 1	1-82	6	B
LOUISVILLE GAS & ELECTRIC	MILL CREEK NO 2	1-81	6	B
LOUISVILLE GAS & ELECTRIC	MILL CREEK NO 3	7-78	2	B
LOUISVILLE GAS & ELECTRIC	MILL CREEK NO 4	6-80	2	A
LOUISVILLE GAS & ELECTRIC	PADDYS RUN NO 6	4-73	1	C
MINNESOTA POWER AND LIGHT CO.	CLAY BOSWELL NO. 4	5-80	2	A
MINNKOTA POWER COOPERATIVE	MILTON R. YOUNG NO. 2	9-77	1	B
MONTANA POWER CO.	COLSTRIP NO 1	11-75	1	B
MONTANA POWER CO.	COLSTRIP NO 2	7-76	1	B
MONTANA POWER CO.	COLSTRIP NO. 3	7-80	3	B
MONTANA POWER CO.	COLSTRIP NO. 4	7-81	3	B
NEVADA POWER	HARRY ALLEN STATION NO. 1	6-83	6	B
NEVADA POWER	HARRY ALLEN STATION NO. 2	6-84	6	B
NEVADA POWER	HARRY ALLEN STATION NO. 3	6-85	6	B
NEVADA POWER	HARRY ALLEN STATION NO. 4	6-86	6	B
NEVADA POWER	REID GARDNER NO 1	4-74	1	B
NEVADA POWER	REID GARDNER NO 2	4-74	1	B
NEVADA POWER	REID GARDNER NO 3	7-76	1	B
NEVADA POWER	REID GARDNER NO 4	0- 0	4	B
NEVADA POWER	WARNER VALLEY STATION NO. 1	6-82	6	B
NEVADA POWER	WARNER VALLEY STATION NO. 2	6-83	6	B
NEW ENGLAND ELEC SYSTEM	BRAYTON POINT NO.3	0- 0	6	C
NIAGARA MOHAWK POWER COOP.	CHARLES R. HUNTLEY NO.6	0-80	3	C
NORTHERN INDIANA PUB SERVICE	BAILLY NO. 7	0- 0	6	C
NORTHERN INDIANA PUB SERVICE	BAILLY NO. 8	0- 0	6	C
NORTHERN INDIANA PUB SERVICE	DEAN H. MITCHELL NO. 11	11-76	1	C
NORTHERN STATES POWER CO.	SHERBURNE COUNTY STATION NO.1	3-76	1	B
NORTHERN STATES POWER CO.	SHERBURNE COUNTY STATION NO.2	4-77	1	B
NORTHERN STATES POWER CO.	SHERBURNE COUNTY STATION NO.3	5-81	3	B
NORTHERN STATES POWER CO.	SHERBURNE COUNTY STATION NO.4	5-83	3	B
OTTER TAIL POWER COMPANY	COYOTE NO. 1	5-81	3	B
PACIFIC GAS AND ELECTRIC	FOSSIL NO. 1	0-84	6	B
PACIFIC GAS AND ELECTRIC	FOSSIL NO. 2	0-85	6	B
PACIFIC POWER AND LIGHT CO.	JIM BRIDGER NO. 4	9-79	2	B
PENNSYLVANIA POWER CO.	BRUCE MANSFIELD NO. 1	4-76	1	B
PENNSYLVANIA POWER CO.	BRUCE MANSFIELD NO. 2	7-77	1	B
PENNSYLVANIA POWER CO.	BRUCE MANSFIELD NO. 3	4-80	3	B
PHILADELPHIA ELECTRIC CO.	CROMBY	6-80	6	B
PHILADELPHIA ELECTRIC CO.	EDDYSTONE NO. 1A	9-75	1	B
PHILADELPHIA ELECTRIC CO.	EDDYSTONE NO. 1B	6-80	4	B
PHILADELPHIA ELECTRIC CO.	EDDYSTONE NO. 2	6-80	6	B
POTOMAC ELECTRIC & POWER	DICKERSON NO. 4	5-85	7	D
POWER AUTHORITY OF NEW YORK	ARTHUR KILL	11-84	7	B
PUBLIC SERVICE CO OF NEW MEX.	SAN JUAN NO. 1	4-78	1	B
PUBLIC SERVICE CO OF NEW MEX.	SAN JUAN NO. 2	7-78	2	B
PUBLIC SERVICE CO OF NEW MEX.	SAN JUAN NO. 3	1-79	2	B
PUBLIC SERVICE CO OF NEW MEX.	SAN JUAN NO. 4	5-81	6	B
PUBLIC SERVICE OF INDIANA	GIBSON 5	0-82	6	A
SALT RIVER PROJECT	CORONADO NO.1	4-79	2	B
SALT RIVER PROJECT	CORONADO NO.2	4-80	2	B
SALT RIVER PROJECT	CORONADO NO.3	0-97	6	B
SOUTH CAROLINA PUBLIC SERVICE	WINYAH NO. 2	7-77	1	A
SOUTH CAROLINA PUBLIC SERVICE	WINYAH NO. 3	5-80	3	A
SOUTHERN ILLINOIS POWER COOP	MARION NO. 4	6-78	2	A
SOUTHERN INDIANA GAS&ELECTRIC	A.B. BROWN NO.1	4-79	2	A
SOUTHERN MISSISSIPPI ELECTRIC	R.D. MORROW NO.1	5-78	2	A
SOUTHERN MISSISSIPPI ELECTRIC	R.D. MORROW NO.2	8-78	2	A
SPRINGFIELD CITY UTILITIES	SOUTHWEST NO. 1	4-77	1	A

1. OPERATIONAL UNITS
2. UNITS UNDER CONSTRUCTION
3. PLANNED - CONTRACT AWARDED
4. PLANNED - LETTER OF INTENT SIGNED
5. PLANNED - REQUESTING/EVALUATING BIDS
6. CONSIDERING ONLY FGD SYSTEMS
7. CONSIDERING FGD SYSTEMS AS WELL AS ALTERNATIVE METHODS

A. BOILER CONSTRUCTED SUBJECT TO FEDERAL NSPS
B. BOILER SUBJECT TO STATE STANDARD THAT IS MORE STRINGENT THAN THE FEDERAL NSPS
C. BOILER SUBJECT TO STATE STANDARD THAT IS EQUAL TO OR LESS STRINGENT THAN NSPS
D. OTHER
E. REGULATORY CLASS UNKNOWN

SECTION 1
SUMMARY LIST OF FGD SYSTEMS

FGD STATUS REPORT 03/78

COMPANY NAME	UNIT NAME	START UP DATE	STATUS	REG CLASS
SPRINGFIELD WATER LIGHT&POWER	DALLMAN NO. 3	7-80	3	A
TENNESSEE VALLEY AUTHORITY	SHAWNEE NO.10A	4-72	1	C
TENNESSEE VALLEY AUTHORITY	SHAWNEE NO.10B	4-72	1	C
TENNESSEE VALLEY AUTHORITY	WIDOWS CREEK NO. 7	0- 0	3	C
TENNESSEE VALLEY AUTHORITY	WIDOWS CREEK NO. 8	5-77	1	C
TEXAS MUNICIPAL POWER AGENCY	GIBBONS CREEK UNIT NO. 1	1-82	3	A
TEXAS POWER AND LIGHT CO.	SANDOW NO.4	7-80	2	A
TEXAS POWER AND LIGHT CO.	TWIN OAKS NO. 1	8-83	6	A
TEXAS POWER AND LIGHT CO.	TWIN OAKS NO. 2	9-84	6	A
TEXAS UTILITIES CO.	FOREST GROVE NO. 1	0-81	6	A
TEXAS UTILITIES CO.	MARTIN LAKE NO. 1	8-77	1	A
TEXAS UTILITIES CO.	MARTIN LAKE NO. 2	2-78	2	A
TEXAS UTILITIES CO.	MARTIN LAKE NO. 3	12-78	2	A
TEXAS UTILITIES CO.	MARTIN LAKE NO. 4	11-82	3	A
TEXAS UTILITIES CO.	MONTICELLO NO.3	2-78	2	A
UTAH POWER & LIGHT CO.	EMERY NO.1	12-78	2	A
UTAH POWER & LIGHT CO.	HUNTINGTON NO.1	5-78	2	A
VIRGINIA ELECTRIC AND POWER CO	MT. STORM	0- 0	7	C
WISCONSIN POWER & LIGHT CO.	COLUMBIA NO. 2	1-80	4	A

1. OPERATIONAL UNITS
2. UNITS UNDER CONSTRUCTION
3. PLANNED - CONTRACT AWARDED
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C. BOILER SUBJECT TO STATE STANDARD THAT IS EQUAL TO OR LESS STRINGENT THAN NSPS
D. OTHER
E. REGULATORY CLASS UNKNOWN

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
ALABAMA ELECTRIC COOP TOMBIGBEE 2 25 MW - NEW COAL 0.6 - 1.5 PERCENT SULFUR PEABODY ENGINEERING LIMESTONE STARTUP 6/78	PEABODY ENGINEERING HAS BEEN AWARDED THE CONTRACT FOR THE INSTALLATION OF A LIMESTONE FGD SYSTEM ON THIS UNIT. A HIGH-EFFICIENCY ESP WILL BE INSTALLED UPSTREAM OF THE FGD SYSTEM TO PROVIDE PRIMARY PARTICULATE CONTROL. THE FGD SYSTEM CONTAINS TWO SCRUBBING TRAINS, TREATING APPROXIMATELY 70 PERCENT OF THE FLUE GAS FOR REMOVAL OF SULFUR DIOXIDE. STACK GAS REHEAT WILL NOT BE REQUIRED. THE TOTAL INSTALLED COST FOR BOTH TOMBIGBEE NO. 2 AND NO. 3 FGD SYSTEMS IS $40.46 MM. CURRENTLY, ERECTION OF THE SCRUBBING EQUIPMENT IS IN PROGRESS.
ALABAMA ELECTRIC COOP TOMBIGBEE 3 225 MW - NEW COAL 0.6 - 1.5 PERCENT SULFUR PEABODY ENGINEERING LIMESTONE STARTUP 6/79	PEABODY ENGINEERING HAS BEEN AWARDED THE CONTRACT FOR THE INSTALLATION OF A LIMESTONE FGD SYSTEM ON THIS UNIT. A HIGH-EFFICIENCY ESP WILL BE INSTALLED UPSTREAM OF THE FGD SYSTEM TO PROVIDE PRIMARY PARTICULATE CONTROL. THE FGD SYSTEM CONSISTS OF TWO TRAINS, TOGETHER TREATING APPROXIMATELY 70 PERCENT OF THE FLUE GAS FOR REMOVAL OF SULFUR DIOXIDE. STACK GAS REHEAT WILL NOT BE REQUIRED. UNIT NO. 3 TURBINE AND BOILER ARE CURRENTLY UNDER CONSTRUCTION. CURRENTLY, FOUNDATION WORK ON THE FGD PLANT IS COMPLETE. EQUIPMENT ERECTION WILL COMMENCE SHORTLY.
ALLEGHENY POWER SYSTEM PLEASANTS 1 625 MW - NEW COAL 4.5 PERCENT SULFUR (MAX) BABCOCK & WILCOX LIME STARTUP 5/79	THE THREE PRINCIPAL OPERATING UTILITY COMPANIES OF THE ALLEGHENY POWER SYSTEM ARE INSTALLING AN EMISSION CONTROL SYSTEM FOR THIS NEW COAL-FIRED UNIT WHICH INCLUDES A HIGH EFFICIENCY ESP UPSTREAM OF FOUR TRAY TOWERS FOR THE CONTROL OF PARTICULATES AND SULFUR DIOXIDE. DESIGN REMOVAL EFFICIENCIES FOR THIS EMISSION CONTROL SYSTEM ARE 99.5 AND 90 PERCENT RESPECTIVELY. THE DRAVO CO. IS SUPPLYING THIOSORBIC LIME. THE CONSULTING ENGINEERING FIRM IS UNITED ENGINEERS AND CONSTRUCTORS. CURRENTLY, ERECTION OF THE SCRUBBING EQUIPMENT IS IN PROGRESS.
ALLEGHENY POWER SYSTEM PLEASANTS 2 625 MW - NEW COAL 4.5 PERCENT SULFUR (MAX) BABCOCK & WILCOX LIME STARTUP 5/80	THE THREE PRINCIPAL OPERATING UTILITY COMPANIES OF THE ALLEGHENY POWER SYSTEM ARE INSTALLING AN EMISSION CONTROL SYSTEM FOR THIS NEW COAL-FIRED UNIT WHICH INCLUDES A HIGH EFFICIENCY ESP UPSTREAM OF FOUR TRAY TOWERS FOR THE CONTROL OF PARTICULATES AND SULFUR DIOXIDE. DESIGN REMOVAL EFFICIENCIES FOR THIS EMISSION CONTROL SYSTEM ARE 99.5 AND 90 PERCENT, RESPECTIVELY. THE DRAVO CO. IS SUPPLYING THIOSORBIC LIME. THE CONSULTING ENGINEERING FIRM IS UNITED ENGINEERS AND CONSTRUCTORS. CURRENTLY, FOUNDATION WORK ON THE SCRUBBER PLANT IS IN PROGRESS.
ARIZONA ELECTRIC POWER COOP APACHE NO 2 200 MW - NEW COAL 0.5- 0.8 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 6/78	AEPC HAS AWARDED A CONTRACT TO RESEARCH COTTRELL FOR A WET LIMESTONE SCRUBBING SYSTEM. THE UNIT WILL FIRE BITUMINOUS COAL WITH A SULFUR CONTENT OF 0.5-0.8%, AND ASH CONTENT OF 10.0% (HEATING VALUE - 10,000-11,000 BTU/LB). THERE IS A 22 ACRE SLUDGE POND AND A 64 ACRE ASH POND. PONDS WILL BE UNLINED AND 10 FEET DEEP. THERE WILL BE NO REHEAT. CONSTRUCTION OF THE SYSTEM IS NOW NEARING COMPLETION. ALL FGD EQUIPMENT IS INSTALLED. SCRUBBER LINING IS COMPLETE. THE PLASTIC GIRDERS SUPPORTING THE MIST ELIMINATORS WERE REPLACED WITH STEEL GIRDERS.
ARIZONA ELECTRIC POWER COOP APACHE NO 3 200 MW - NEW COAL 0.5- 0.8 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 6/79	STRUCTURAL STEELWORK FOR HOT-SIDE UOP ESP'S IS COMPLETE. STRUCTURE ERECTION OF THE SCRUBBER-ABSORBER TOWERS IS COMPLETE. EACH SCRUBBER CAN HANDLE 400,000 ACFM @ 270 F AND RECIRCULATE 20,000 GPM OF SLURRY. BOILER CONSTRUCTION HAS BEGUN. THERE ARE CURRENTLY 2 PONDS WITH A TOTAL OF 20-YRS CAPACITY FOR THE DISPOSAL OF THE UNFIXATED SLUDGE. 2 ADDITIONAL PONDS ARE PLANNED PROVIDING AN ADDITIONAL 20 YRS OF DISPOSAL CAPABILITY. THERE WILL BE NO REHEAT AND A KELLOGG LINER IS PLANNED FOR THE WET STACK, WHICH WILL CONSIST OF A COMMON OUTER SHELL AND A SEPARATE FLUE FOR EACH UNIT.
ARIZONA PUBLIC SERVICE CHOLLA NO 1 115 MW - RETROFIT COAL 0.48-1 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 10/73	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS LIMESTONE SCRUBBING SYSTEM WAS PLACED IN SERVICE IN OCTOBER 1973. THE SCRUBBER PLANT CONSISTS OF TWO PARALLEL SCRUBBING TRAINS. PARTICULATE CONTROL IS PROVIDED BY TWO FLOODED-DISC SCRUBBERS. SO2 CONTROL IS PROVIDED BY ONE PACKED (HUNTERS PACKING) TOWER (A-SIDE). FLUE GAS CLEANING WASTES ARE DISCHARGED TO AN EXISTING FLY ASH POND. NO WATER IS RECYCLED BACK FROM THE DISPOSAL POND. IN-LINE STEAM REHEATERS RAISE THE GAS TEMPERATURE 40 F.
ARIZONA PUBLIC SERVICE CHOLLA NO 2 250 MW - NEW COAL 0.48-1 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 6/78	THE CONTRACT FOR THIS WET LIMESTONE SCRUBBING SYSTEM HAS BEEN AWARDED BY THE UTILITY TO RESEARCH-COTTRELL. THIS SYSTEM IS A LARGER-SCALE APPLICATION OF THE CHOLLA NO.1 DESIGN. ALL DESIGN AND ENGINEERING WORK HAS BEEN COMPLETED. CONSTRUCTION OF THE UNIT IS NOW NEARING COMPLETION. THE UNIT COMMENCIAL START-UP DATE IS JUNE 1978. THE FGD SYSTEM CONSISTS OF FOUR PARALLEL FLOODED-DISC SCRUBBERS AND PACKED TOWER ABSORBER TRAINS. THREE ARE REQUIRED FOR FULL LOAD CAPACITY. INITIAL BOILER START-UP DATE IS FEBRUARY 1978.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
ARIZONA PUBLIC SERVICE CHOLLA NO. 4 350 MW - NEW COAL 0.44-1 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 8/80	UNIT NO. 4 IS CURRENTLY UNDER CONSTRUCTION. APS HAS AWARDED THE FGD CONTRACT TO RESEARCH COTTRELL. THE STATE REGULATORY AGENCY HAS NOT YET DECIDED THE EMISSIONS REGULATIONS WHICH WILL APPLY TO THE PLANT. THE C-E BOILER WILL FIRE THE SAME COAL AS CHOLLA NO. 1, WITH SULFUR CONTENT OF 0.44-1.0 PERCENT. THE A-E FIRM IS EBASCO. COMMERCIAL START-UP IS SLATED FOR 08/80. THE FGD SYSTEM IS A DOUBLE LOOP LIMESTONE ABSORPTION PROCESS AND REVENUES OF THE CONTRACT TO R-C ARE REPORTED TO BE 85 MM.
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 1 175 MW - RETROFIT COAL 0.75 PERCENT SULFUR CHEMICO/APS LIME/ALKALINE FLYASH STARTUP 07 0	APS WILL BE UPGRADING THE OPERATIONAL PARTICULATE SCRUBBERS AT THE FOUR CORNERS UNIT NOS. 1, 2 AND 3 FOR ADDITIONAL SO2 REMOVAL. EACH UNIT HAS 2 CHEMICO VENTURI SCRUBBER MODULES FOR PARTICULATE CONTROL. ROUGHLY 30% OF THE FLUE GAS SO2 CONTENT IS REMOVED AT THE PRESENT TIME IN THE VENTURIS WITH THE HIGH ALKALINE FLYASH. NEW MEXICO APC OFFICALS INDICATED THAT THE 5 FOUR CORNERS UNITS WILL BE REQUIRED TO REMOVE AT LEAST 67.5% OF THE STATION SO2 (ALL 5 UNITS CONSIDERED TOGETHER). UPGRADING OF THE VENTURIS WILL BE AFFECTED BY ADJUSTING PH.
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 2 175 MW - RETROFIT COAL 0.75 PERCENT SULFUR CHEMICO/APS LIME/ALKALINE FLYASH STARTUP 07 0	APS MAY BE UPGRADING THE OPERATIONAL PARTICULATE SCRUBBERS AT THE FOUR CORNERS UNIT NOS. 1, 2 AND 3 FOR ADDITIONAL SO2 REMOVAL. EACH UNIT HAS 2 CHEMICO VENTURI SCRUBBER MODULES FOR PARTICULATE CONTROL. ROUGHLY 30% OF THE FLUE GAS SO2 CONTENT IS REMOVED AT THE PRESENT TIME IN THE VENTURIS WITH THE HIGH ALKALINE FLYASH. NEW MEXICO APC OFFICALS INDICATED THAT THE 5 FOUR CORNERS UNITS WILL BE REQUIRED TO REMOVE AT LEAST 67.5% OF THE STATION SO2 (ALL 5 UNITS, CONSIDERED TOGETHER). UPGRADING OF THE VENTURIS WILL BE AFFECTED BY ADJUSTING PH.
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 3 229 MW - RETROFIT COAL 0.75 PERCENT SULFUR CHEMICO/APS LIME/ALKALINE FLYASH STARTUP 07 0	APS WILL BE UPGRADING THE OPERATIONAL PARTICULATE SCRUBBERS AT THE FOUR CORNERS UNIT NOS. 1, 2 AND 3 FOR ADDITIONAL SO2 REMOVAL. EACH UNIT HAS 2 CHEMICO VENTURI SCRUBBER MODULES FOR PARTICULATE CONTROL. ROUGHLY 30% OF THE FLUE GAS SO2 CONTENT IS REMOVED AT THE PRESENT TIME IN THE VENTURIS WITH THE HIGH ALKALINE FLYASH. NEW MEXICO APC OFFICALS INDICATED THAT THE 5 FOUR CORNERS UNITS WILL BE REQUIRED TO REMOVE AT LEAST 67.5% OF THE STATION SO2 (ALL 5 UNITS CONSIDERED TOGETHER). UPGRADING OF THE VENTURIS WILL BE AFFECTED BY ADJUSTING PH.
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 4 755 MW - RETROFIT COAL 0.7 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 07 0	THE UTILITY IS CURRENTLY EVALUATING THE DATA AND INFORMATION ACCUMULATED DURING THE HORIZONTAL PROTOTYPE SCRUBBING PROGRAM IN ORDER TO ASCERTAIN VARIOUS POSSIBLE STRATEGIES TO CONTROL THE EMISSIONS FROM THIS COAL FIRED 755-MW UNIT. APS WILL BE REQUIRED TO REDUCE THE CURRENT LEVEL OF SO2 EMISSIONS FROM THE ENTIRE PLANT BY INCREASING THE REMOVAL EFFICIENCY TO AT LEAST 67.5%. A DECISION ON THE USE OF FGD FOR THIS UNIT WILL BE ANNOUNCED SHORTLY.
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 5 755 MW - RETROFIT COAL 0.7 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 07 0	THE UTILITY IS CURRENTLY EVALUATING THE DATA AND INFORMATION ACCUMULATED DURING THE HORIZONTAL PROTOTYPE SCRUBBING PROGRAM IN ORDER TO ASCERTAIN VARIOUS POSSIBLE STRATEGIES TO CONTROL THE EMISSIONS FROM THIS COAL-FIRED 755-MW UNIT. A DECISION, PENDING THE OUTCOME OF LOCAL REGULATORY AGENCY HEARINGS, WILL BE ANNOUNCED IN THE NEAR FUTURE.
BASIN ELECTRIC POWER COOP ANTELOPE VALLEY NO. 1 450 MW - NEW LIGNITE 1.0 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 07/81	THE UTILITY IS CURRENTLY PLANNING TO INSTALL A WET SCRUBBING SYSTEM TO CONTROL SO2 EMISSIONS FROM THIS LIGNITE-FIRED BOILER. VARIOUS PROCESSES ARE NOW BEING EVALUATED BY THE UTILITY. THIS NEW FACILITY IS LOCATED IN THE MERCER COUNTY AREA NEAR BEULAH, NORTH DAKOTA AND IS KNOWN AS THE ANTELOPE VALLEY STATION. BOTH UNITS 1 AND 2 WILL BE REQUIRED TO COMPLY WITH AIR EMISSION STANDARDS VIA BEST AVAILABLE TECHNOLOGY. START-UP IS SCHEDULED FOR 1981. BIDS ARE EXPECTED TO GO OUT THIS SUMMER.
BASIN ELECTRIC POWER COOP ANTELOPE VALLEY NO. 2 450 MW - NEW LIGNITE 1.0 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 07/83	THE UTILITY IS CURRENTLY INVESTIGATING VARIOUS FGD PROCESSES FOR THIS SECOND LIGNITE-FIRED UNIT SCHEDULED AT THIS NEW STATION LOCATED IN MERCER COUNTY, NEAR BEULAH, NORTH DAKOTA. THIS NEW FACILITY WILL BE KNOWN AS THE ANTELOPE VALLEY STATION AND WILL BE REQUIRED TO COMPLY WITH AIR EMISSION STANDARDS VIA THE BEST AVAILABLE TECHNOLOGY. START-UP IS NOW SCHEDULED FOR 1983. BIDS ARE EXPECTED TO GO OUT THIS SUMMER.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
BASIN ELECTRIC POWER COOP LARAMIE RIVER NO. 1 550 MW - NEW COAL 0.8 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 4/80	RESEARCH-COTTRELL IS CURRENTLY FABRICATING THE DUAL-LOOP LIMESTONE WET SCRUBBERS. ON-SITE CONSTRUCTION COMMENCED IN JANUARY 1978. SLUDGE WILL BE DEWATERED TO 83% SOLIDS BEFORE LANDFILL. THE SCRUBBERS WILL BE MADE OF STAINLESS STEEL AND WILL HANDLE 2.3 MM ACFM AT 286 F. L/G RATIO WILL BE 60. THE TOTAL CAPITAL COST FOR BOTH THE SYSTEMS IS ESTIMATED TO BE 80 MM DOLLARS. THE OPERATING COST WILL BE 1.5 MILLS/KWH. B&W HAS BEEN AWARDED CONTRACT FOR 2 ESP'S AT A COMBINED COST OF $28 MM. THE ESP'S ARE FOR UNITS 1 AND 2. STACK WILL BE CONCRETE WITH ACID BRICK LINING.
BASIN ELECTRIC POWER COOP LARAMIE RIVER NO. 2 550 MW - NEW COAL 0.8 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 10/80	RESEARCH-COTTRELL IS CURRENTLY FABRICATING THE DUAL-LOOP LIMESTONE WET SCRUBBERS. ON-SITE CONSTRUCTION COMMENCED IN JANUARY 1978. SLUDGE WILL BE DEWATERED TO 83% SOLIDS BEFORE LANDFILL. THE SCRUBBERS WILL BE MADE OF STAINLESS STEEL AND WILL HANDLE 2.3 MM ACFM AT 286 F. L/G RATIO WILL BE 60. THE TOTAL CAPITAL COST FOR BOTH THE SYSTEMS IS ESTIMATED TO BE 80 MM DOLLARS. THE OPERATING COST WILL BE 1.5 MILLS/KWH. B&W HAS BEEN AWARDED CONTRACT FOR 2 ESP'S AT A COMBINED COST OF $28 MM. THE ESP'S ARE FOR UNITS 1 AND 2. STACK WILL BE CONCRETE WITH ACID BRICK LINING.
BASIN ELECTRIC POWER COOP LARAMIE RIVER NO. 3 550 MW - NEW COAL 0.8 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 4/82	THE UTILITY IS STILL CONSIDERING VARIOUS FGD PROCESSES. LARAMIE RIVER STATION WILL FIRE SUB-BITUMINOUS COAL WITH THE FOLLOWING CHARACTERISTICS: 8100 BTU/LB, 0.8 PERCENT SULFUR AND 7.0 PERCENT ASH.
BIG RIVERS ELECTRIC COOP CORP. REID NO. 2 250 MW - NEW COAL 3.5-4.0 PERCENT SULFUR AMERICAN AIR FILTER LIME STARTUP 12/79	THE EMISSION CONTROL SYSTEM FOR THIS NEW COAL-FIRED UNIT IS BEING SUPPLIED BY AMERICAN AIR FILTER. THE SYSTEM WILL CONSIST OF A COLD-SIDE ESP AND TWO SPRAY TOWERS CONTROLLING PARTICULATE AND SO2 TO 99.6 PERCENT AND 90 PERCENT, RESPECTIVLEY. THE B&W BOILER WILL FIRE HIGH SULFUR (3.5 TO 4.5 PERCENT) WESTERN KENTUCKY COAL. FGD SYSTEM FOUNDATIONS HAVE BEEN LAID, ONE REACTION TANK HAS BEEN ASSEMBLED AND A SECOND TANK IS BEING CONSTRUCTED. THE DESIGN INCLUDES AN INDIRECT HOT AIR REHEAT SYSTEM. IUCS WILL CONSTRUCT A SLUDGE DISPOSAL SYSTEM TO SERVICE BOTH REID 2 AND 3
BIG RIVERS ELECTRIC COOP CORP. REID NO. 3 240 MW - NEW COAL 3.5-4.0 PERCENT SULFUR AMERICAN AIR FILTER LIME STARTUP 12/80	THE EMISSION CONTROL SYSTEM FOR THIS NEW COAL-FIRED UNIT IS BEING SUPPLIED BY AMERICAN AIR FILTER. THE SYSTEM WILL CONSIST OF A COLD-SIDE ESP AND TWO SPRAY TOWERS CONTROLLING PARTICULATE AND SO2 TO 99.6 PERCENT AND 90 PERCENT, RESPECTIVELY. THE B&W BOILER WILL FIRE HIGH SULFUR (3.5 TO 4.5 PERCENT) WESTERN KENTUCKY COAL. THE FGD SYSTEM WILL INCLUDE AN INDIRECT HOT AIR REHEAT SYSTEM. IUCS WILL CONSTRUCT A SLUDGE DISPOSAL SYSTEM TO SERVICE BOTH REID 2 AND 3. THE BOILER IS CURRENTLY UNDER CONSTRUCTION. SCRUBBER CONSTRUCTION WILL BEGIN IN JULY, '78.
BOARD OF MUNICIPAL UTILITIES SIKESTON POWER STATION 235 MW - NEW COAL 2.8 PERCENT SULFUR RANCOCK & WILCOX LIMESTONE STARTUP 6/81	B&W HAS AWARDED A CONTRACT FOR BOILER AND AIR QUALITY CONTROL SYSTEM INSTALLATION. 2.8 PERCENT SULFUR COAL IS TO BE BURNED. THE AQC SYSTEM WILL CONSIST OF 2 ESP'S FOLLOWED BY 3 SCRUBBERS EACH CAPABLE OF HANDLING 50% OF THE BOILER LOAD, ONE WILL BE ON STAND-BY AT ALL TIMES. SIKESTON STATION WILL FEATURE A DOUBLE-LINED STACK, 2 PONDS, ONE FOR FLY ASH, THE OTHER FOR SCRUBBER SLUDGE/BOTTOM-ASH DISPOSAL, AND 4 AXIAL FLOW FANS. NO STACK GAS REHEAT IS PLANNED. MAXIMUM FLUE GAS CAPACITY IS 748,390 ACFM @ 288 F. CONSTRUCTION COMMENCED IN MARCH 1978.
BRAZOS ELECTRIC POWER COOP SAN MIGUEL NO. 1 400 MW - NEW LIGNITE 1.67 PERCENT SULFUR RANCOCK & WILCOX LIMESTONE STARTUP 6/80	THE EMISSION CONTROL EQUIPMENT FOR THE COAL-FIRED RADIANT BOILER WILL CONSIST OF AN ESP UPSTREAM OF FOUR LIMESTONE SCRUBBING MODULES. THE SCRUBBER FLUE GAS CAPACITY IS NOMINALLY DESIGNED AT 1,579 MILLION ACFM (302 F). DESIGN SO2 REMOVAL EFFICIENCY IS 86 PERCENT FOR 4400 PPM SO2 INLET. L/G RATIOS ARE 10 AND 45 FOR QUENCHER AND ABSORBER, RESPECTIVELY. RESEARCH COTTRELL HAS BEEN AWARDED SLUDGE DISPOSAL CONTRACT. FGD SYSTEM FOUNDATION IS COMPLETE WITH STRUCTURAL STEEL ABOUT 40% ERECTED. BOILER CONSTRUCTION IS ABOUT 50% COMPLETE.
CENTRAL ILLINOIS LIGHT CO. DUCK CREEK NO. 1 400 MW - NEW COAL 2.5 - 3.0 PERCENT SULFUR RILEY STOKER / ENVIRONEERING LIMESTONE STARTUP 8/78	CONSTRUCTION OF THE FOUR VENTURI-SORBER MODULES BY RILEY STOKER IS ON SCHEDULE. SCRUBBER TANKS AND PUMPS WILL BE NEOPRENE LINED. THE FIRST LIMESTONE SLURRY SCRUBBER MODULE WAS PLACED IN SERVICE ON SEPTEMBER 9, 1976, AND OPERATED INTERMITTENTLY UNTIL APRIL 1, 1977. A HIGH EFFICIENCY ESP IS INSTALLED UPSTREAM OF FOUR VENTURI-SORBER SCRUBBER MODULES FOR PARTICULATE CONTROL. CONCRETE STACK IS LINED WITH CEILCOTE FLAKELINE 151. NO REHEAT PLANNED. DESIGN PARTICULATE AND SULFUR DIOXIDE REMOVAL EFFICIENCIES ARE 99.8 AND 85 PERCENT, RESPECTIVELY.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
CENTRAL ILLINOIS LIGHT CO. DUCK CREEK NO.2 400 MW - NEW COAL 2.5-3.0 PERCENT SULFUR VENDOR NOT SELECTED LIMESTONE STARTUP 1/82	SCRUBBING UNIT IS SCHEDULED TO COMMENCE OPERATIONS IN JANUARY 1982. THE UTILITY HAS NOT YET SELECTED A SYSTEM SUPPLIER. A DECISION CONCERNING THE STATUS OF THE BOILER AND CONTROL STRATEGY WILL BE ANNOUNCED IN EARLY 1978. THE UTILITY IS LOOKING AT ESP'S FOR PARTICULATE CONTROL AND LIMESTONE OR DUAL ALKALI FOR SO2 SCRUBBING. THE PLANT IS NOW IN THE PROCESS OF PREPARING SPECS.
CENTRAL ILLINOIS PUBLIC SERV NEWTON NO.1 575 MW - NEW COAL 4.0 PERCENT SULFUR BUELL/ENVIROTECH DUOBLE ALKALI STARTUP 11/79	A CONTRACT HAS BEEN AWARDED BY CIPSCO TO BUELL/ENVIROTECH FOR THE INSTALLATION OF AN EMISSION CONTROL SYSTEM ON UNIT NO. 1. THE KEY COMPONENTS OF THE EMISSION CONTROL SYSTEM INCLUDE; A HIGH-EFFICIENCY ESP, FOUR PRECOOLERS, FOUR POLYSPHERE ABSORBERS, THREE THICKENERS, TWO EXPERIMENTAL REHEAT SYSTEMS, AND THREE HORIZONTAL EXTRACTION FILTERS FOR SLUDGE DEWATERING. APPROXIMATELY 35 PERCENT OF THE CONSTRUCTION WORK AT THE PLANT HAS BEEN COMPLETED. THE FGD SYSTEM WILL HAVE CEILCOTE-LINED ABSORBER MODULES.
CENTRAL MAINE POWER CO. SEARS ISLAND NO. 1 600 MW - NEW COAL SOURCE UNDETERMINED VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 11/86	BECAUSE OF THE DISCOVERY OF A GEOLOGICAL FAULT ON SEARS ISLAND, THE UTILITY HAS CANCELLED PLANS FOR A 1150-MW NUCLEAR POWER PLANT. A 600-MW COAL-FIRED UNIT IS NOW BEING PLANNED IN ITS PLACE. COMMERCIAL OPERATION IS PROJECTED FOR NOVEMBER 1986. COMPLIANCE WITH SO2 NSPS WILL BE ACHIEVED BY INSTALLING AN FGD SYSTEM. LIME AND LIMESTONE SCRUBBING PROCESSES ARE BEING GIVEN PRIMARY CONSIDERATION. CURRENTLY, CMPCO HAS FILED AN APPLICATION WITH THE STATE PUBLIC UTILITIES COMMISSION. AN ENVIRONMENTAL PERMIT APPLICATION WILL BE FILED WITHIN THE NEXT TWO YEARS.
CINCINNATI GAS & ELECTRIC CO. EAST BEND NO 2 600 MW - NEW COAL BABCOCK & WILCOX LIME STARTUP 1/81	A CONTRACT HAS BEEN CONDITIONALLY AWARDED TO BABCOCK AND WILCOX FOR A COMMERCIAL LIME SCRUBBING SYSTEM. A COAL SOURCE AND SUPPLY HAS NOT BEEN FINALIZED. COMMERCIAL START-UP DATE HAS BEEN DELAYED ONE YEAR TO JANUARY 1981. THE A-E DESIGN FIRM IS SARGENT AND LUNDY.
COLORADO UTE ELECTRIC ASSN. CRAIG NO. 1 450 MW - NEW COAL 0.45 PERCENT SULFUR PEABODY ENGINEERING LIMESTONE STARTUP 3/79	THE CONSTRUCTION OF THE LIMESTONE SLURRY SPRAY TOWER SCRUBBING SYSTEM FOR SULFUR DIOXIDE REMOVAL FROM LOW-SULFUR COAL-FIRED BOILER FLUE GAS HAS BEGUN. THE FOUNDATION IS COMPLETE AND THE SILOS ARE UP. PARTICULATE CONTROL WILL BE PROVIDED BY HOT-SIDE ESP'S UPSTREAM OF THE SCRUBBER PLANT. SLUDGE DISPOSAL IS UNDECIDED. THERE WILL BE A STEAM COIL TYPE STACK GAS REHEAT INCLUDED. REQUIRED PARTICULATE AND SULFUR DIOXIDE REMOVAL EFFICIENCIES ARE 99.8 AND 85 PERCENT, RESPECTIVELY. FGD SYSTEM START-UP IS SCHEDULED FOR SPRING 1979.
COLORADO UTE ELECTRIC ASSN. CRAIG NO. 2 450 MW - NEW COAL 0.45 PERCENT SULFUR PEABODY ENGINEERING LIMESTONE STARTUP 3/79	PEABODY ENGINEERED SYSTEMS HAS BEEN AWARDED A CONTRACT IN EXCESS OF $60 MILLION TO DESIGN AND SUPPLY A LIMESTONE SLURRY SPRAY TOWER SCRUBBING SYSTEM FOR SO2 REMOVAL FROM LOW-SULFUR COAL-FIRED BOILER FLUE GAS FOR UNITS 1 & 2. PARTICULATE CONTROL WILL BE PROVIDED BY HOT-SIDE ESP'S UPSTREAM OF THE SCRUBBER PLANT. SLUDGE WILL BE STABILIZED AND HAULED TO A MINEFILL. THERE WILL BE A STEAM COIL TYPE STACK GAS REHEATER INCLUDED. REQUIRED PARTICULATE AND SO2 REMOVAL EFFICIENCIES ARE 99.8 AND 85 PERCENT, RESPECTIVELY. FGD START-UP IS SCHEDULED FOR SPRING 1979.
COLUMBUS & SOUTHERN OHIO ELEC. CONESVILLE NO 5 400 MW - NEW COAL 4.5 - 4.9 PERCENT SULFUR UNIVERSAL OIL PRODUCTS LIME STARTUP 1/77	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE BOILER AND ESP WERE COMPLETED AND PLACED IN SERVICE IN SEPT. 1976. THE B-SIDE MODULE BECAME AVAILABLE FOR SERVICE IN JANUARY 1977. COMMERCIAL OPERATIONS WERE ACHIEVED ON FEBRUARY 13, 1977. THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A COLD-SIDE ESP FOLLOWED BY TWO TCA LIME SCRUBBING MODULES SUPPLIED BY UOP. DRAVO IS SUPPLYING THE THIOSORBIC LIME SCRUBBING REAGENT. IUCS IS SUPPLYING THEIR POZ-O-TEC SLUDGE STABILIZATION FACILITY.
COLUMBUS & SOUTHERN OHIO ELEC. CONESVILLE NO 6 400 MW - NEW COAL 4.5 - 4.9 PERCENT SULFUR UNIVERSAL OIL PRODUCTS LIME STARTUP 4/78	THE UTILITY SIGNED LONG-TERM CONTRACTS WITH DRAVO FOR THE PURCHASE OF THIOSORBIC LIME AND WITH IUCS FOR A SLUDGE FIXATION SYSTEM. CONSTRUCTION OF THIS UNIT COMMENCED IN 1977 AND IS SCHEDULED TO BE COMPLETED BY JANUARY 1978. SIMILAR TO CONESVILLE NO.5, THIS MINE MOUTH PLANT WILL BURN COAL WITH 17 PERCENT ASH CONTENT AND 4.5 TO 4.9 PERCENT SULFUR CONTENT. AN ELECTROSTATIC PRECIPITATOR WILL BE INSTALLED UPSTREAM THE FGD SYSTEM. THE FGD SYSTEM WILL INCLUDE TWO TCA MODULES FOR THE REMOVAL OF SO2. THE A-E DESIGN FIRM IS BLACK AND VEATCH.

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SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
COLUMBUS & SOUTHERN OHIO ELEC. PUSTON NO. 5 515 MW = NET COAL 2.5 PERCENT SULFUR REGION NOT SELECTED PROCESS NOT SELECTED STARTUP 07/81	THIS UNIT WILL BURN HIGH SULFUR OHIO COAL (APPROXIMATELY 2.5 PERCENT SULFUR CONTENT). THE DESIGN OF THE EMISSION CONTROL STRATEGY HAS NOT YET BEEN FINALIZED.
COLUMBUS & SOUTHERN OHIO ELEC. PUSTON NO. 6 515 MW = NET COAL 2.5 PERCENT SULFUR REGION NOT SELECTED PROCESS NOT SELECTED STARTUP 07/83	THIS UNIT WILL BURN HIGH SULFUR COAL (APPROXIMATELY 2.5 PERCENT SULFUR CONTENT). THE DESIGN OF THE EMISSION CONTROL STRATEGY FOR THIS UNIT HAS NOT YET BEEN FINALIZED.
COMMONWEALTH EDISON PUREKIN NO. 51 465 MW = NET COAL 5.0 PERCENT SULFUR UNIVERSAL OIL PRODUCTS LIMESTONE STARTUP 12/79	UOP HAS AWARDED THE CONTRACT FOR THE INSTALLATION OF A WET LIMESTONE SCRUBBING SYSTEM THAT WILL BE BACKFITTED ONTO BOILER NO. 51, ONE OF TWO IDENTICAL BOILERS SUPPLYING STEAM TO AN 850-MW TURBINE-GENERATOR. THE FGD SYSTEM IS DESIGNED TO TREAT FLUE GAS RESULTING FROM THE COMBUSTION OF HIGH SULFUR COAL (5.0 PERCENT SULFUR; 8.3 PERCENT ASH; 17.3 PERCENT MOISTURE; 10,900 BTU/LB.) AND MEET SO2 EMISSION STANDARDS OF 1.8 LB. SO2/MM BTU. CURRENTLY, EXCAVATION, BACKFILL, AND STRUCTURAL STEEL ERECTION IS IN PROGRESS.
COOPERATIVE POWER ASSOCIATION COAL CREEK NO. 1 545 MW = NET LIGNITE - 0.63 PERCENT SULFUR COMBUSTION ENGINEERING LIME STARTUP 8/79	THIS UNIT IS UNDER THE COMBINED OWNERSHIP OF CO-OP POWER AND UNITED POWER ASSOCIATION. THE CONTRACT FOR THIS SCRUBBING SYSTEM HAS BEEN AWARDED TO COMBUSTION ENGINEERING FOR THE INSTALLATION OF LIME FGD SYSTEMS ON UNITS NOS. 1 & 2 AT THIS STATION. THE SCRUBBING SYSTEM FOR EACH BOILER WILL CONSIST OF FOUR SPRAY TOWER ABSORBER MODULES FOR SO2 REMOVAL. ELECTROSTATIC PRECIPITATORS WILL BE INSTALLED UPSTREAM OF EACH SCRUBBING SYSTEM. CONSTRUCTION BEGAN EARLY IN AUGUST 1977 AND THE UNIT IS NOW 70-75% COMPLETE. BAD WEATHER HAS SLOWED CONSTRUCTION SLIGHTLY.
COOPERATIVE POWER ASSOCIATION COAL CREEK NO. 2 545 MW = NET LIGNITE - 0.63 PERCENT SULFUR COMBUSTION ENGINEERING LIME STARTUP 11/79	THIS UNIT IS UNDER THE COMBINED OWNERSHIP OF CO-OP POWER AND UNITED POWER ASSOCIATION. THE CONTRACT FOR THIS SCRUBBING SYSTEM HAS BEEN AWARDED TO COMBUSTION ENGINEERING FOR THE INSTALLATION OF LIME FGD SYSTEMS ON UNITS NOS. 1 & 2 AT THIS STATION. THE SCRUBBING SYSTEM FOR EACH BOILER WILL CONSIST OF FOUR SPRAY TOWER ABSORBER MODULES FOR SO2 REMOVAL. ELECTROSTATIC PRECIPITATORS WILL BE INSTALLED UPSTREAM OF EACH SCRUBBING SYSTEM. CONSTRUCTION BEGAN IN AUGUST 1977 AND IS NOW 40% COMPLETE. THERE HAVE BEEN MINOR DELAYS BUT START-UP IS STILL SCHEDULED FOR 11/79.
DELMARVA POWER CO. DELAWARE CITY NOS. 1 2 & 3 100 MW = NET/UNIT CURE 1-8 PERCENT SULFUR UNIT POWERGAS WELLMAN LORD STARTUP 6/80	DELMARVA'S DELAWARE CITY PLANT HAS 4 BOILERS, 3 OF WHICH HAVE OUTPUTS OF 500K LBS STEAM/HR EACH. THE BOILERS GENERATE STEAM AS WELL AS ELECTRICAL POWER FOR GETTY REFINING & MARKETING. 7-8 % S COKE WILL BE BURNED IN THE BOILERS (INSTEAD OF THE LOW-S CRUDE OIL NOW BURNED) WHEN THE SCRUBBER GOES INTO OPERATION IN APRIL 1980. DELMARVA WILL USE VENTURI SCRUBBERS FOR PARTICULATE REMOVAL AND WELLMAN LORD FGD SYSTEMS AT EACH BOILER GAS EXIT FOR SO2 CONTROL. PARTICULATE AND SULFUR DIOXIDE REMOVAL EFFICIENCIES ARE 98 AND 85-90 PERCENT, RESPECTIVELY. CONSTRUCTION COMMENCED JAN. 1978.
DUQUESNE LIGHT ELRAMA POWER STATION 510 MW = NET/UNIT COAL 1.8-2.2 PERCENT SULFUR CHEMICO LIME STARTUP 10/75	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. OPERATIONS ARE CONTINUING WITH THREE BOILERS COUPLED INTO THE FIVE-MODULE SCRUBBING SYSTEM. THE PLANT IS FIRING 1.8 - 2.2 PERCENT SULFUR COAL. SCRUBBING WASTES ARE CHEMICALLY FIXATED BY THE IUCS SYSTEM AND LANDFILLED.
DUQUESNE LIGHT PHILLIPS POWER STATION 410 MW = NET/UNIT COAL 1.8-2.2 PERCENT SULFUR CHEMICO LIME STARTUP 7/73	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS SCRUBBING SYSTEM HAS BEEN IN SERVICE SINCE JULY 1973. ALL 6 BOILERS ARE COUPLED INTO THE SCRUBBING SYSTEM. THE PLANT FIRES COAL WITH A HEATING VALUE OF 11,000 BTU/LB AND ASH AND SULFUR CONTENTS OF 21 PERCENT AND 1.8 - 2.2 PERCENT, RESPECTIVELY. DEWATERED SLUDGE FROM THE IUCS INTERIM PROCESSING PLANT IS BEING HAULED TO AN OFF-SITE LANDFILL. THE SLUDGE CONTAINS NO FIXATIVE.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
EASTERN KENTUCKY POWER COOP SPURLOCK GENERATING PLANT NO.2 500 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 5/80	THE SPURLOCK GENERATING PLANT IS LOCATED APPROXIMATELY 3 MILES WEST OF MAYSVILLE, KENTUCKY. TWO NEW UNITS ARE SCHEDULED FOR THIS STATION. UNIT NO. 1 BEGAN OPERATION IN EARLY SEPT., IT DOES NOT HAVE TO MEET NSPS. THE CONTRACTED COAL FOR UNIT NO.1 WILL MEET SO2 COMPLIANCE. UNIT NO.2 WILL BE CONTROLLED BY A 99.5 PERCENT EFFICIENT ESP. THE UTILITY HAS COMPLETED SPECIFICATIONS FOR THE SCRUBBING SYSTEM. MAKEUP WATER WILL COME FROM COOLING TOWER BLOWDOWN. NEITHER THE FGD PROCESS NOR THE SUPPLIER HAS BEEN SELECTED.
GENERAL PUBLIC UTILITIES CONO NO.1 800 MW - NEW COAL 3.5 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 5/81	STARTUP DATE CHANGED TO 5/87 FOR BOTH BOILER AND DESULFURIZATION SYSTEM. LIME, LIMESTONE SCRUBBING, AND COAL DESULFURIZATION ARE THE PRIMARY STRATEGIES BEING CONSIDERED FOR COMPLIANCE WITH NEW SOURCE PERFORMANCE STANDARDS. NO DECISION HAS BEEN MADE YET.
GENERAL PUBLIC UTILITIES SEWARD NO.7 800 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 5/84	STARTUP DATE CHANGED TO 5/84 FOR BOTH BOILER AND DESULFURIZATION SYSTEM. LIME, LIMESTONE SCRUBBING, AND COAL DESULFURIZATION ARE THE PRIMARY STRATEGIES BEING CONSIDERED FOR COMPLIANCE WITH NEW SOURCE PERFORMANCE STANDARDS. NO DECISION HAS BEEN MADE YET.
GULF POWER CO. CRIST NO. 6 AND NO. 7 150 MW - METHOFII VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 8/78	EACH UNIT IS 75 MW. IF SCRUBBERS ARE SELECTED THEY WILL BE REQUIRED IN 1979. NO DECISION HAS YET BEEN ANNOUNCED.
GULF POWER CO. CRIST NO. 6 AND NO. 7 320 MW - NEW VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 8/80	UNIT 6 IS 320 MW. UNIT 7 IS 500 MW. FGD MAY BE REQUIRED IN 1980. NO DECISION HAS YET BEEN ANNOUNCED.
GULF POWER CO. LANSING SMITH NO. 1 AND NO. 2 505 MW - METHOFII COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 8/80	UNIT NO. 1 IS 125 MW. UNIT NO. 2 IS 180 MW. IF SCRUBBERS ARE SELECTED, THEY WILL BE REQUIRED IN 1979 AND 1980 ON THE RESPECTIVE UNITS.
HOOSIER COOPERATIVE MEROM NO. 1 490 MW - NEW COAL 3.5 PERCENT SULFUR VENDOR NOT SELECTED LIMESTONE STARTUP 12/80	HOOSIER COOP HAS AWARDED A CONTRACT TO MITSUBISHI INTERNATIONAL CORP. FOR A WET LIMESTONE SO2 CONTROL SYSTEM AT EACH OF HOOSIER COOP.S NEW MEROM UNITS, NOS. 1 & 2. THE NEW 490 MW COAL-FIRED UNITS ARE PLANNED FOR LOCATION IN SULLIVAN, INDIANA. THE FLUE GAS STREAMS WILL BE CLEANED OF PARTICULATES WITH ESPS (99.4%) AND OF SULFUR DIOXIDE WITH LIMESTONE SCRUBBERS (90%). SLUDGE WILL BE STABILIZED AND STOCK PILED. THE UTILITY IS CURRENTLY REQUESTING/EVALUATING BIDS FOR THE FGD SYSTEMS. FGD START-UP DATES ARE SCHEDULED FOR LATE 1980 (NO.1) AND MID 1981 (NO.2).
HOOSIER COOPERATIVE MEROM NO. 2 490 MW - NEW COAL 3.5 PERCENT SULFUR VENDOR NOT SELECTED LIMESTONE STARTUP 10/81	HOOSIER COOP HAS AWARDED A CONTRACT TO MITSUBISHI INTERNATIONAL CORP. FOR A WET LIMESTONE SO2 CONTROL SYSTEM AT EACH OF HOOSIER COOP.S NEW MEROM UNITS, NOS. 1 & 2. THE NEW 490 MW COAL-FIRED UNITS ARE PLANNED FOR LOCATION IN SULLIVAN, INDIANA. THE FLUE GAS STREAMS WILL BE CLEANED OF PARTICULATES WITH ESPS (99.4%) AND OF SULFUR DIOXIDE WITH LIMESTONE SCRUBBERS (90%). SLUDGE WILL BE STABILIZED AND STOCK PILED. THE UTILITY IS CURRENTLY REQUESTING/EVALUATING BIDS FOR THE FGD SYSTEMS. FGD START-UP DATES ARE SCHEDULED FOR LATE 1980 (NO.1) AND MID 1981 (NO.2).

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
INDIANAPOLIS POWER & LIGHT CO. PETERSBURG NO 3 550 MW = NEW COAL 3.0-3.5 PERCENT SULFUR UNIVERSAL OIL PRODUCTS LIMESTONE STARTUP 10/77	INDIANAPOLIS P & L AWARDED A CONTRACT TO UNIVERSAL OIL PRODUCTS FOR A WET LIMESTONE SCRUBBING SO2 CONTROL SYSTEM. AN ESP PROVIDES PRIMARY PARTICULATE CONTROL. THE UNIT FIRES BITUMINOUS COAL WITH A SULFUR CONTENT OF 3.0-3.5%, AN ASH CONTENT OF 9-10%, AND A HEAT CONTENT OF 11,000 BTU/LB. THE FOUR MODULES OPERATED FOR 24 HOURS IN MID-DECEMBER FOR EQUIPMENT TESTING. THE SCRUBBERS WERE TAKEN OUT OF SERVICE SO THAT SOME FINAL ADJUSTMENTS COULD BE MADE. SCRUBBERS ARE EXPECTED TO BE BACK IN SERVICE BY MID-APRIL 1978.
INDIANAPOLIS POWER & LIGHT CO. PETERSBURG NO 4 530 MW = NEW COAL 3.5 PERCENT SULFUR VENDOR NOT SELECTED LIMESTONE STARTUP 6/82	INDIANAPOLIS POWER & LIGHT ANNOUNCED THAT A NEW COAL-FIRED POWER GENERATING UNIT IS BEING PLANNED FOR THEIR PETERSBURG GENERATING STATION LOCATED IN PETERSBURG, INDIANA. THIS NEW UNIT WILL FIRE HIGH-SULFUR SUBBITUMINOUS COAL WITH A HEATING VALUE OF 11,000 BTU/LB AND ASH AND SULFUR CONTENTS OF 10 PERCENT AND 3.5 PERCENT, RESPECTIVELY. THE UTILITY IS NOW CONSIDERING VARIOUS FGD STRATEGIES FOR THE CONTROL OF SULFUR DIOXIDE, GIVING PRIMARY CONSIDERATION TO WET LIMESTONE SCRUBBING. BIDS FOR FGD SYSTEM ARE NOW BEING EVALUATED.
KANSAS CITY POWER & LIGHT MONTROSE NO. 3 140 MW = RETROFIT COAL 0.5-3.5 PERCENT SULFUR COMBUSTION ENGINEERING LIME STARTUP 11/76	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE SCRUBBER PLANT HAS BEEN CONVERTED FROM A LIMESTONE FURNACE INJECTION AND TAIL-END SCRUBBING SYSTEM TO A TAIL-END WET LIME SCRUBBING SYSTEM. LIME-BASED OPERATIONS COMMENCED ON FEBRUARY 7, 1977. COMPLIANCE TESTING FOR KANSAS CITY PARTICULATE STANDARDS INDICATED THE NO.3 UNIT WAS WELL WITHIN THE 0.17 POUND REGULATION. THE 2-MODULE SCRUBBER PLANT CAN ONLY BE BY-PASSED DURING EMERGENCIES.
KANSAS CITY POWER & LIGHT MONTROSE NO. 4 100 MW = RETROFIT COAL 0.5-3.5 PERCENT SULFUR COMBUSTION ENGINEERING LIME STARTUP 6/78	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE SCRUBBER PLANT HAS BEEN CONVERTED FROM A LIMESTONE FURNACE INJECTION AND TAIL-END SCRUBBING SYSTEM TO A TAIL-END WET LIME SCRUBBING SYSTEM. OPERATIONS IN THE LIME SCRUBBING MODE COMMENCED ON JANUARY 1, 1977. COMPLIANCE TESTING FOR KANSAS CITY PARTICULATE REGULATIONS INDICATED THE UNIT IS MEETING THE 0.17 POUND REGULATION. THE 2-MODULE SCRUBBER PLANT CAN ONLY BE BY-PASSED DURING EMERGENCIES.
KANSAS CITY POWER & LIGHT LA CYGNE NO 1 820 MW = NEW COAL 3.0 PERCENT SULFUR BABCOCK & WILCOX LIMESTONE STARTUP 2/73	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE EMISSION CONTROL SYSTEM FOR THIS NEW COAL-FIRED POWER-GENERATING UNIT CONSISTS OF EIGHT SCRUBBER MODULES FOR FLY ASH AND SO2 REMOVAL. EACH MODULE INCLUDES A VENTURI SCRUBBER IN SERIES WITH A 2-STAGE IMPINGEMENT PLATE ABSORBER. THE SCRUBBER PLANT IS AN INTEGRAL PART OF THE POWER-GENERATING COMPLEX, ALLOWING NO FLUE GAS BYPASS. INITIAL OPERATIONS COMMENCED IN FEB. 1973. COMMERCIAL SERVICE WAS ATTAINED BY JUNE 1973. TOTAL SYSTEM AVAILABILITY FOR THE MONTH OF JANUARY WAS 96 PERCENT.
KANSAS POWER & LIGHT JEFFERY NO. 1 680 MW = NEW COAL 0.30 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 6/78	KP&L HAS PURCHASED A COMBUSTION ENGINEERING AIR QUALITY CONTROL SYSTEM FOR PARTICULATE AND SO2 REMOVAL CONSISTING OF A COLD-SIDE ESP, I.D. FANS, BY-PASS CAPABILITY, AND SPRAY TOWERS. AN OVERFIRE AIR SYSTEM AT THE TANGENTIAL FIRED PULVERIZED BURNERS WILL CONTROL NOX EMISSIONS. THE CLEANED GASES WILL BE VENTED TO A 600 FT STACK. CONSTRUCTION IS PROCEEDING ACCORDING TO SCHEDULE. THE ESP'S HAVE BEEN INSTALLED. THE SLURRY HOLD TANKS AND ABSORBERS ARE IN PLACE. SLUDGE DISPOSAL STRATEGY HAS NOT BEEN FINALIZED. THIS UNIT WILL FIRE 0.3% SULFUR (6% ASH) WYOMING COAL.
KANSAS POWER & LIGHT JEFFERY NO. 2 680 MW = NEW COAL 0.30 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 6/80	KP&L HAS PURCHASED A COMBUSTION ENGINEERING AIR QUALITY CONTROL SYSTEM FOR PARTICULATE AND SO2 REMOVAL CONSISTING OF A COLD SIDE ESP, I.D. FANS, BY-PASS CAPABILITY, AND SPRAY TOWERS. AN OVERFIRE AIR SYSTEM AT THE TANGENTIAL FIRED PULVERIZED BURNERS WILL CONTROL NOX EMISSIONS. THE CLEANED GASES WILL BE VENTED TO A 600 FT STACK. CONSTRUCTION IS PROCEEDING ACCORDING TO SCHEDULE. THE ESP'S ARE NOW GOING IN. THE SLURRY HOLD TANKS AND ABSORBERS ARE IN PLACE. SLUDGE DISPOSAL STRATEGY HAS NOT BEEN FINALIZED. THIS UNIT WILL FIRE 0.3% SULFUR (6% ASH) WYOMING COAL.
KANSAS POWER & LIGHT LAWRENCE NO 4 125 MW = RETROFIT COAL 0.5 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 12/68	REFER TO BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE NEW LIMESTONE FGD SYSTEM COMMENCED OPERATIONS IN EARLY JANUARY 1977. THERE HAVE BEEN NO FORCED SCRUBBER OUTAGES REPORTED SINCE START-UP. CONTINUOUS SO2 MONITORS HAVE RECORDED SO2 REMOVAL EFFICIENCIES OF BETTER THAN 85%. PARTICULATE REMOVAL IS REPORTED TO BE EXCELLENT, YIELDING NO VISIBLE PLUME. THE PLANT IS FIRING COAL RATED AT 10,000 BTU/LB WITH A SULFUR CONTENT OF 0.5%.

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SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
KANSAS POWER & LIGHT LAWRENCE NO 5 400 MW - NEW COAL 0.5 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 11/71	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE ORIGINAL LIMESTONE INJECTION AND TAIL-END SCRUBBING SYSTEM WAS SHUT DOWN ON MARCH 20 SO THAT THE NEW ROD-SCRUBBER AND SPRAY TOWER ABSORBER SYSTEM COULD BE TIED INTO THE UNIT. THE NEW SCRUBBER PLANT INCLUDES 2 MODULES, EACH CAPABLE OF HANDLING APPROXIMATELY 50 PERCENT OF THE TOTAL BOILER FLUE GAS FLOW AND SHOULD BE ON LINE BY THE FIRST OF MAY. THE SYSTEM DESIGNER AND SUPPLIER IS COMBUSTION ENGINEERING. THE UNIT FIRES LOW SULFUR WYOMING COAL WITH A HEAT CONTENT OF 10,000 BTU/LB.
KENTUCKY UTILITIES GREEN RIVER NOS. 1 2 AND 3 64 MW - RETROFIT COAL 3.8 PERCENT SULFUR AMERICAN AIR FILTER LIME STARTUP 9/75	REFER TO BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE SCRUBBER PLANT INSTALLED AT THIS STATION CONSISTS OF ONE MODULE DESIGNED TO REMOVE PARTICULATES (VARIABLE-THROAT VENTURI) AND SO2 (MOBILE-BED ABSORBER) FROM COAL-FIRED BOILER FLUE GAS. THE SCRUBBER WAS DESIGNED AND SUPPLIED BY AAF. INITIAL SCRUBBER PLANT STARTUP OCCURRED IN SEPTEMBER 1975. SCRUBBING OPERATIONS RESUMED IN NOVEMBER FOLLOWING A 5-MONTH SHUTDOWN RESULTING FROM A STRIKE BY PLANT OPERATING PERSONNEL. THE SYSTEM HAS HAD LOW AVAILABILITY BECAUSE OF FROZEN EQUIPMENT.
LAKELAND UTILITIES MCINTOSH POWER PLANT UNIT NO.3 350 MW - NEW COAL 2.6 PERCENT SULFUR VENDOR NOT SELECTED LIMESTONE STARTUP 10/81	THE CITY OF LAKELAND DEPARTMENT OF ELECTRIC AND WATER UTILITIES AWARDED A $17.5MM TOTAL INSTALLED COST CONTRACT TO B&W FOR AN EMISSION CONTROL SYSTEM ON THE UTILITY'S NEW 350 MW POWER GENERATING UNIT, MCINTOSH NO. 3. THE UNIT WILL UTILIZE COLD-SIDE ESP'S FOR PARTICULATE REMOVAL AND LIMESTONE ABSORPTION FOR SO2 CONTROL. START-UP IS SCHEDULED FOR OCTOBER 1981.
LOUISVILLE GAS & ELECTRIC CANE RUN NO 4 178 MW - RETROFIT COAL 3.5 - 4.0 PERCENT SULFUR AMERICAN AIR FILTER LIME STARTUP 8/76	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE FGD SYSTEM RETROFITTED ON THIS BOILER WAS DESIGNED AND SUPPLIED BY AMERICAN AIR FILTER AND WAS FIRST PLACED IN THE GAS PATH ON AUGUST 7, 1976. THE SYSTEM CONSISTS OF TWO PARALLEL MODULES WHICH INCLUDE MOBILE BED CONTACTORS AND OPERATE WITH A CARBIDE LIME ADDITIVE. FOLLOWING A NUMBER OF MAJOR SYSTEM MODIFICATIONS (CHEVRON-TYPE MIST ELIMINATOR, OIL FIRED REHEAT, PLASITE DUCT LINER, HIGHER L/G), THE SYSTEM SUCCESSFULLY PASSED COMPLIANCE TESTING (85% SO2 REMOVAL) ON AUGUST 3 AND 4, 1977.
LOUISVILLE GAS & ELECTRIC CANE RUN NO 5 183 MW - RETROFIT COAL 3.5 - 4.0 PERCENT SULFUR COMBUSTION ENGINEERING LIME STARTUP 12/77	REFER TO THE BACKGROUND INFORMATION IN SECTION 3 OF THIS REPORT. THE FGD SYSTEM FOR THIS UNIT WAS DESIGNED AND SUPPLIED BY COMBUSTION ENGINEERING. IT CONSISTS OF TWO SPRAY TOWER ABSORBERS FOR FULL-LOAD SO2 REMOVAL AND UTILIZES CARBIDE LIME AS THE SCRUBBING REAGENT. IN-LINE STEAM REHEAT, A COMMON REACTION TANK, AND A THICKENER FOR SOLIDS DEWATERING ARE INCLUDED. AN EXISTING UPSTREAM ESP PROVIDES PRIMARY PARTICULATE CONTROL. THE FGD SYSTEM BEGAN INITIAL OPERATION IN DEC. '77 BUT THE COAL STRIKE FORCED A PLANT SHUTDOWN. THE SYSTEM WAS RE-STARTED MARCH 24, 1978.
LOUISVILLE GAS & ELECTRIC CANE RUN NO 6 277 MW - RETROFIT COAL 3.5 - 4.0 PERCENT SULFUR AUL/COMBUSTION EQUIP ASSOCIATE DOUBLE ALKALI STARTUP 12/79	THE CONTRACT FOR THIS FULL-SCALE DEMONSTRATION SCRUBBING SYSTEM HAS BEEN AWARDED TO A.D.LITTLE/COMBUSTION EQUIPMENT ASSOC. FOR THE INSTALLATION OF A DOUBLE ALKALI SCRUBBER. THE FEDERAL EPA WILL SUBSIDIZE A MAXIMUM $4.5 MM FOR OPERATION, RESEARCH AND DEVELOPMENT, AND REPORT WRITING FOR A ONE-YEAR PERIOD FOLLOWING THE FIRST THREE MONTHS OF OPERATION (NOTE-THIS SUBSIDY WILL NOT BE APPLIED FOR ANY CAPITAL EXPENDITURES). ENGINEERING DESIGN WORK IS UNDERWAY. SITE PREPARATION, EXCAVATION AND FOUNDATION WORK COMMENCED IN JULY. DUCTWORK TIE-IN IS COMPLETE.
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 1 350 MW - RETROFIT COAL 3.5- 4.0 PERCENT SULFUR VENDOR NOT SELECTED LIME STARTUP 1/82	A COMPLIANCE SCHEDULE HAS BEEN SUBMITTED TO THE JEFFERSON COUNTY AIR POLLUTION CONTROL DISTRICT WITH 1/82 ESTABLISHED AS THE STARTUP DATE FOR AN FGD SYSTEM. OPERATING DATA AND INFORMATION FROM THE FULL-SCALE SCRUBBER PLANT NOW IN SERVICE ON THE NO.4 UNIT AT CANE RUN WILL BE OBTAINED BEFORE THE UTILITY PROCEEDS WITH ADDITIONAL SYSTEM DESIGN WORK.
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 2 350 MW - RETROFIT COAL 3.5- 4.0 PERCENT SULFUR VENDOR NOT SELECTED LIME STARTUP 1/81	A COMPLIANCE SCHEDULE HAS BEEN SUBMITTED TO THE JEFFERSON COUNTY AIR POLLUTION CONTROL DISTRICT WITH 1/81 ESTABLISHED AS THE STARTUP DATE FOR AN FGD SYSTEM. OPERATING DATA AND INFORMATION FROM THE FULL-SCALE SCRUBBER PLANT NOW IN SERVICE ON THE NO.4 UNIT AT CANE RUN WILL BE OBTAINED BEFORE THE UTILITY PROCEEDS WITH ADDITIONAL SYSTEM DESIGN WORK.

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UNIT IDENTIFICATION	CURRENT MONTH
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 3 425 MW - NEW COAL 3.5- 4.0 PERCENT SULFUR AMERICAN AIR FILTER LIME STARTUP 7/78	BECAUSE POWER DEMAND HAS NOT COME UP AS RAPIDLY AS HAD BEEN EXPECTED, UNIT START-UP HAS BEEN MOVED BACK TO APRIL 15, 1978. CONSTRUCTION ON THIS NEW FACILITY'S FGD SYSTEM IS NEARING COMPLETION. THE SYSTEM IS DESIGNED AND SUPPLIED BY AMERICAN AIR FILTER AND WILL UTILIZE CARBIDE LIME AS THE ABSORBENT. FOUR MOBILE-BED ABSORBERS WILL TREAT THE FLUE GAS RESULTING FROM THE COMBUSTION OF HIGH SULFUR COAL. THE SYSTEM WILL OPERATE IN A CLOSED WATER LOOP. THE SCRUBBING WASTE WILL BE STABILIZED WITH FLYASH AND LIME.
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 4 495 MW - NEW COAL 3.5- 4.0 PERCENT SULFUR AMERICAN AIR FILTER LIME STARTUP 6/80	BECAUSE POWER DEMAND HAS NOT COME UP AS RAPIDLY AS HAD BEEN EXPECTED, UNIT START-UP HAS BEEN MOVED BACK TO JUNE 1980. CONSTRUCTION OF THIS NEW 495-MW COAL-FIRED UNIT IS ON SCHEDULE. CURRENTLY, FOUNDATION WORK IS IN PROGRESS. THIS AAF SYSTEM WILL INCLUDE MOBILE-BED ABSORBERS TREATING HIGH SULFUR COAL FLUE GAS. THE SYSTEMS WATER LOOP WILL BE CLOSED. THE SLUDGE WILL BE STABILIZED WITH LIME AND FLYASH. STEAM REHEAT WILL PROVIDE GAS TEMPERATURE ELEVATION OF THE SCRUBBED GASES PRIOR TO DISCHARGE TO THE MAIN STACK.
LOUISVILLE GAS & ELECTRIC PADDYS RUN NO 6 65 MW - RETROFIT COAL 3.5 - 4.0 PERCENT SULFUR COMBUSTION ENGINEERING LIME STARTUP 4/75	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS SCRUBBING SYSTEM WAS DESIGNED BY COMBUSTION ENGINEERING AND PLACED IN SERVICE IN APRIL 1973. THE FGD SYSTEM CONSISTS OF TWO 2-STAGE MARBLE BED ABSORBERS WHICH ARE DESIGNED TO USE CARBIDE LIME ADDITIVE AS THE SCRUBBING REAGENT. PADDYS RUN NO. 6 IS A PEAK-LOAD UNIT THAT OPERATES ONLY DURING DEMAND PERIODS. AN EXTENSIVE EPA SCRUBBER/SLUDGE EVALUATION STUDY WAS COMPLETED IN AUGUST 1977.
MINNESOTA POWER AND LIGHT CO. CLAY BOSWELL NO. 4 500 MW - NEW COAL 0.8 PERCENT SULFUR PEABODY ENGINEERING LIME/ALKALINE FLYASH STARTUP 5/80	MINNESOTA P & L HAS AWARDED A CONTRACT TO PEABODY ENGINEERING FOR A LIME/ALKALINE FLYASH SO2 CONTROL SYSTEM. THE CONFIGURATION WILL BE VENTURI SCRUBBERS FOLLOWED BY SPRAY TOWERS. HOT SIDE ESP'S WILL BE USED FOR PARTICULATE CONTROL. STACK GAS REHEAT WILL BE ACCOMPLISHED BY BYPASSING 5% OF FLUE GAS AROUND THE SCRUBBER. THE UNIT WILL FIRE SUB-BITUMINOUS COLSTRIP COAL WITH A SULFUR CONTENT OF 0.8%, AND AN ASH CONTENT OF 9.0% (HEATING VALUE - 8300 BTU/LB). MAKE-UP WATER SOURCE WILL BE THE RIVER AND THE CLAY-LINED POND. FOUNDATIONS ARE 80% COMPLETE.
MINNKOTA POWER COOPERATIVE MILTON R. YOUNG NO. 2 450 MW - NEW LIGNITE 0.7 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE LIME/ALKALINE FLYASH STARTUP 9/77	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS LIME/ALKALINE FLYASH SCRUBBING SYSTEM WAS DESIGNED AND SUPPLIED BY ADL/CONTRUCTION EQUIPMENT ASSOCIATEES. IT CONSISTS OF A COLD-SIDE ESP FOLLOWED BY TWO SPRAY TOWERS. MIST ELIMINATION IS PROVIDED BY A WASH TRAY AND CHEVRON ARRANGEMENT. 25% FLUE GAS BYPASS PROVIDES STACK GAS REHEAT. THE UNIT FIRES A LOW-SULFUR NORTH DAKOTA LIGNITE WITH AN AVERAGE ASH CONTENT OF 8 PERCENT, SULFUR CONTENT OF 0.7 PERCENT, AND HEAT CONTENT OF 6500 BTU/LB.
MONTANA POWER CO. COLSTRIP NO 1 360 MW - NEW COAL 0.8 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE LIME/ALKALINE FLYASH STARTUP 11/75	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS FGD EQUIPPED UNIT WAS DECLARED COMMERCIAL IN NOVEMBER 1975. THE SCRUBBING SYSTEM PROVIDES PARTICULATE AND SO2 CONTROL WITH THREE SCRUBBER MODULES. EACH MODULE CONSISTS OF A DOWNFLOW VENTURI SCRUBBER CENTERED WITHIN AN UPFLOW SPRAY TOWER ABSORBER. EACH MODULE CAN TREAT 40% OF THE TOTAL BOILER FLUE GAS AND THE MODULES CANNOT BE BYPASSED. THE UNSTABILIZED SLUDGE IS DISPOSED IN AN ON-SITE LINED DISPOSAL POND. IN-LINE STEAM REHEAT AND CLOSED WATER LOOP CAPABILITY ARE INCLUDED IN THE SYSTEM.
MONTANA POWER CO. COLSTRIP NO 2 360 MW - NEW COAL 0.8 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE LIME/ALKALINE FLYASH STARTUP 7/76	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS FGD EQUIPPED UNIT WAS DECLARED COMMERCIAL IN AUGUST 1976. THE SCRUBBING SYSTEM PROVIDES PARTICULATE AND SO2 CONTROL WITH THREE SCRUBBER MODULES. EACH MODULE CONSISTS OF A DOWNFLOW VENTURI SCRUBBER CENTERED WITHIN AN UPFLOW SPRAY TOWER ABSORBER. EACH MODULE CAN TREAT 70% OF THE TOTAL BOILER FLUE GAS AND THE MODULES CANNOT BE BYPASSED. THE UNSTABILIZED SLUDGE IS DISPOSED IN AN ON-SITE LINED DISPOSAL POND. IN-LINE STEAM REHEAT AND CLOSED WATER LOOP CAPABILITY ARE INCLUDED IN THE SYSTEM.
MONTANA POWER CO. COLSTRIP NO. 3 700 MW - NEW COAL 0.7 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE LIME/ALKALINE FLYASH STARTUP 7/80	A CONTRACT FOR THE INSTALLATION OF TWO ADDITIONAL LIME/ALKALINE FLYASH SCRUBBING SYSTEMS HAS BEEN AWARDED TO A.D. LITTLE/COMBUSTION EQUIPMENT ASSOCIATES. THESE SYSTEMS WILL BE INSTALLED ON UNITS NOS. 3 AND 4 OF THE COLSTRIP POWER STATION. COLSTRIP UNITS 1 AND 2 ARE BOTH EQUIPPED WITH OPERATIONAL LIME/ALKALINE FLYASH SCRUBBING SYSTEMS FOR THE REMOVAL OF PARTICULATES AND SULFUR DIOXIDE. ENGINEERING WORK FOR THE NEW SYSTEMS IS NOW UNDERWAY. THIS CONTRACT IS EXPECTED TO EXCEED 850 MW.

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UNIT IDENTIFICATION	CURRENT MONTH
MONTANA POWER CO. COLSTRIP NO. 4 700 MW - NEW COAL 0.7 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE LIME/ALKALINE FLYASH STARTUP 7/81	A CONTRACT FOR THE INSTALLATION OF TWO ADDITIONAL LIME/ALKALINE FLYASH SCRUBBING SYSTEMS HAS BEEN AWARDED TO A.D. LITTLE/COMBUSTION EQUIPMENT ASSOCIATES. THESE SYSTEMS WILL BE INSTALLED ON UNITS NOS. 3 AND 4 OF THE COLSTRIP POWER STATION. COLSTRIP UNITS 1 AND 2 ARE BOTH EQUIPPED WITH OPERATIONAL LIME/ALKALINE FLYASH SCRUBBING SYSTEMS FOR THE REMOVAL OF PARTICULATES AND SULFUR DIOXIDE. ENGINEERING WORK FOR THE NEW SYSTEMS IS NOW UNDERWAY. THIS CONTRACT IS EXPECTED TO EXCEED $50 MM.
NEVADA POWER HARRY ALLEN STATION NO. 1 500 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 6/83	CONSIDERING HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED.
NEVADA POWER HARRY ALLEN STATION NO. 2 500 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 6/84	CONSIDERING HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED.
NEVADA POWER HARRY ALLEN STATION NO. 3 500 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 6/85	CONSIDERING HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED.
NEVADA POWER HARRY ALLEN STATION NO. 4 500 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 6/86	CONSIDERING HOT SIDE ESP IN CONJUNCTION WITH AN FGD SYSTEM. SPECIFICATIONS HAVE NOT YET BEEN PREPARED.
NEVADA POWER REID GARDNER NO 1 125 MW - RETROFIT COAL 0.5 - 1.0 PERCEN SULFUR ADL/COMBUSTION EQUIP ASSOCIATE SODIUM CARBONATE STARTUP 4/74	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS SODIUM CARBONATE-BASED (TRONA) SCRUBBING SYSTEM CONSISTS OF ONE MODULE CONTAINING A TWIN VARIABLE-THROAT VENTURI SCRUBBER FOLLOWED BY A SEPARATOR IN SERIES WITH A SINGLE-STAGE PERFORATED-PLATE ABSORBER TOWER. PRIMARY PARTICULATE CONTROL IS PROVIDED BY UPSTREAM MECHANICAL COLLECTORS. A STEAM INDIRECT HOT AIR REHEAT SYSTEM RAISES THE GAS TEMPERATURE 30 F PRIOR TO DISCHARGE TO THE MAIN STACK. THE FLUE GAS CLEANING WASTES ARE ULTIMATELY DISPOSED IN AN ON-SITE CLAY-LINED SOLAR EVAPORATION POND.
NEVADA POWER REID GARDNER NO 2 125 MW - RETROFIT COAL 0.5 - 1.0 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE SODIUM CARBONATE STARTUP 4/74	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS SODIUM CARBONATE-BASED (TRONA) SCRUBBING SYSTEM CONSISTS OF ONE MODULE CONTAINING A TWIN VARIABLE-THROAT VENTURI SCRUBBER FOLLOWED BY A SEPARATOR IN SERIES WITH A SINGLE-STAGE PERFORATED-PLATE ABSORBER TOWER. PRIMARY PARTICULATE CONTROL IS PROVIDED BY UPSTREAM MECHANICAL COLLECTORS. A STEAM INDIRECT HOT AIR REHEAT SYSTEM RAISES THE GAS TEMPERATURE 30 F PRIOR TO DISCHARGE TO THE MAIN STACK. THE FLUE GAS CLEANING WASTES ARE ULTIMATELY DISPOSED IN AN ON-SITE CLAY-LINED SOLAR EVAPORATION POND.
NEVADA POWER REID GARDNER NO 3 125 MW - NEW COAL 0.5 - 1.0 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE SODIUM CARBONATE STARTUP 7/76	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS UNIT IS A NEW COAL-FIRED BOILER THAT IS EQUIPPED WITH SODIUM CARBONATE-BASED(TRONA)SCRUBBING SYSTEM WHICH INCORPORATES A TWIN VARIABLE-THROAT VENTURI SCRUBBER FOLLOWED BY A SEPARATOR IN SERIES WITH A SINGLE-STAGE PERFORATED-PLATE ABSORBER TOWER. THE MODULE WAS FIRST PLACED IN SERVICE ON BOILER FLUE GAS IN JULY 1976. MECHANICAL COLLECTORS PROVIDE PRIMARY PARTICULATE CONTROL. REHEAT IS PROVIDED BY A STEAM INDIRECT HOT AIR REHEAT SYSTEM. WASTE DISPOSAL IS ON-SITE CLAY-LINED POND.

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UNIT IDENTIFICATION	CURRENT MONTH
NEVADA POWER REID GARDNER NO 4 125 MW - NEW COAL 0.5- 1.0 PERCENT SULFUR ADL/COMBUSTION EQUIP ASSOCIATE SODIUM CARBONATE STARTUP 0/ 0	NEVADA POWER COMPANY HAS SIGNED A LETTER OF INTENT WITH COMBUSTION EQUIPMENT ASSOCIATES FOR THE CONSTRUCTION OF AN FGD SYSTEM ON REID GARDNER NO. 4. HOWEVER, CONSTRUCTION OF THE BOILER HAS BEEN INDEFINITELY POSTPONED.
NEVADA POWER WARNER VALLEY STATION NO. 1 250 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 6/82	SPECIFICATIONS ARE BEING PREPARED FOR A SCRUBBING SYSTEM. NEVADA POWER HAS NOT YET ANNOUNCED PLANS FOR THIS UNIT'S EMISSION CONTROL STRATEGY.
NEVADA POWER WARNER VALLEY STATION NO. 2 250 MW - NEW COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 6/83	SPECIFICATIONS ARE BEING PREPARED FOR A SCRUBBING SYSTEM. NEVADA POWER HAS NOT YET ANNOUNCED PLANS FOR THIS UNIT'S EMISSION CONTROL STRATEGY.
NEW ENGLAND ELEC SYSTEM BRAYTON POINT NO.3 650 MW - RETROFIT FUEL OIL, LOW SULFUR VENDOR NOT SELECTED REGENERABLE NOT SELECTED STARTUP 0/ 0	THE UTILITY IS CURRENTLY INVESTIGATING VARIOUS ADVANCED REGENERABLE FLUE GAS DESULFURIZATION SYSTEMS WHICH OFFER A BREAKTHROUGH IN OPERATING COSTS AND PRODUCE ELEMENTAL SULFUR AS AN END PRODUCT. THE UTILITY IS CURRENTLY INVOLVED IN BENCH AND LABORATORY SCALE INVESTIGATIONS OF SULFUR RECOVERY. THE NO. 3 UNIT IS CURRENTLY OPERATIONAL, FIRING LOW SULFUR FUEL OIL.
NIAGARA MOHAWK POWER COOP. CHARLES R. HUNTLEY NO.6 100 MW - RETROFIT COAL 2.5-4.5 PERCENT SULFUR ATOMICS INTERNATIONAL AQUEOUS CARBONATE STARTUP 0/80	A CONTRACT WAS AWARDED TO ATOMICS INTERNATIONAL FOR THE DESIGN AND INSTALLATION OF AN AQUEOUS CARBONATE FGD SYSTEM. THIS DEMONSTRATION SYSTEM WILL PRODUCE END-PRODUCT SULFUR. FUNDS ARE BEING PROVIDED BY THE US EPA AND THE EMPIRE STATE ELECTRIC ENERGY RESEARCH CORP. THE DESIGN SO2 REMOVAL EFFICIENCY WILL BE 90 PERCENT. AN INTERMEDIATE UNIT IS BEING CONSIDERED AS A PILOT BEFORE APPLICATION OF THE 100 MW SCALE UNIT. GROUND BREAKING FOR CONSTRUCTION WILL BE IN JUNE 1978.
NORTHERN INDIANA PUB SERVICE BAILLY NO. 7 190 MW - RETROFIT COAL 3 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 0/ 0	CONSIDERING A LIME OR LIMESTONE SCRUBBING UNIT. ALSO WAITING FOR PERFORMANCE OF WELLMAN LORD/ALLIED CHEMICAL UNIT IN SERVICE AT THEIR DEAN H. MITCHELL NO. 11 UNIT. LOW SULFUR COAL MAY BE EMPLOYED TO COMPLY WITH SO2 EMISSION REGULATIONS. APPLICABLE INDIANA SO2 REGULATIONS ARE STILL NOT FIRMLY ESTABLISHED.
NORTHERN INDIANA PUB SERVICE BAILLY NO. 8 400 MW - RETROFIT COAL 3 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 0/ 0	CONSIDERING A LIME OR LIMESTONE SCRUBBING UNIT. ALSO WAITING FOR PERFORMANCE OF WELLMAN LORD/ALLIED CHEMICAL UNIT UNDER CONSTRUCTION AT THEIR DEAN H. MITCHELL NO. 11 UNIT. LOW SULFUR COAL MAY BE BURNED TO COMPLY WITH SO2 EMISSION REGULATIONS. APPLICABLE INDIANA SO2 REGULATIONS ARE STILL NOT FIRMLY ESTABLISHED.
NORTHERN INDIANA PUB SERVICE DEAN H. MITCHELL NO. 11 115 MW - RETROFIT COAL 3.2-3.5 PERCENT SULFUR DAVY POWERGAS/ALLIED CHEMICAL WELLMAN LORD/ALLIED CHEMICAL STARTUP 11/76	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS FGD SYSTEM IS AN INTEGRATION OF THE WELLMAN-LORD SO2 RECOVERY PROCESS OFFERED BY DAVY POWERGAS AND THE SO2 TO SULFUR REDUCTION PROCESS DEVELOPED BY ALLIED CHEMICAL. DAVY POWERGAS IS THE DESIGN AND CONSTRUCTION FIRM AND ALLIED CHEMICAL IS SYSTEM OPERATOR AND PRODUCT MARKETER. PERFORMANCE TESTS WERE SUCCESSFULLY COMPLETED ON SEPTEMBER 14, 1977. A DEMONSTRATION YEAR COMMENCED ON SEPTEMBER 16, 1977.

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UNIT IDENTIFICATION	CURRENT MONTH
NORTHERN STATES POWER CO. SHERBURNE COUNTY STATION NO.1 710 MW - NEW COAL 0.8 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 3/76	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. FULL COMMERCIAL OPERATION OF THE SYSTEM BEGAN ON MAY 1, 1976. THE SCRUBBING SYSTEM FOR THIS UNIT CONSISTS OF 12 MODULES. EACH SCRUBBING MODULE INCORPORATES A VENTURI-ROD SECTION AND A MARBLE BED ABSORBER FOR PARTICULATE AND SULFUR DIOXIDE REMOVAL. A FORCED OXIDATION SYSTEM CONVERTS ALL THE CALCIUM SULFITE TO SULFATE PRIOR TO DISCHARGE TO A CLAY-LINED SETTLING POND. STACK GAS REHEAT IS PROVIDED BY IN-LINE HOT WATER TUBES.
NORTHERN STATES POWER CO. SHERBURNE COUNTY STATION NO.2 710 MW - NEW COAL 0.8 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 9/77	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE SHERBURNE NO. 2 AIR QUALITY CONTROL SYSTEM IS IDENTICAL IN DESIGN TO THE SYSTEM IN OPERATION ON THE NO. 1 UNIT AT THIS STATION. TWELVE 2-STAGE PARTICULATE SCRUBBER (VENTURI-ROD SCRUBBER) AND SULFUR DIOXIDE ABSORBER (MARBLE-BED ABSORBER) MODULES ARE PROVIDED FOR FLY ASH AND SO2 CONTROL. ELEVEN MODULES ARE REQUIRED FOR FULL GENERATING CAPACITY OPERATIONS. THE CALCIUM SULFITE IS FORCIBLY OXIDIZED TO SULFATE PRIOR TO DISCHARGE TO THE DISPOSAL POND. STACK GAS REHEAT PROVIDED BY IN-LINE HOT WATER TUBES.
NORTHERN STATES POWER CO. SHERBURNE COUNTY STATION NO.3 860 MW - NEW COAL 0.8 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 5/81	TWO ADDITIONAL COAL-FIRED POWER-GENERATING UNITS ARE SCHEDULED TO BE INSTALLED AT NSP'S SHERBURNE COUNTY GENERATING STATION IN BECKER MINNESOTA. COMBUSTION ENGINEERING WAS AWARDED A CONTRACT FOR LIMESTONE SLURRY SPRAY TOWER FGD SYSTEMS ON THE 860 MW UNITS 3 & 4. THE TWO STAGE SCRUBBING MODULES REMOVE PARTICULATE (99.5%) & SO2 (80%). COMMERCIAL START-UP DATES ARE NOW SCHEDULED FOR MAY 1981 AND MAY 1983. THE BOILER CONTRACT HAS BEEN AWARDED TO BABCOCK AND WILCOX AND THE TURBINE WILL BE SUPPLIED BY GENERAL ELECTRIC. CONSTRUCTION IS SCHEDULED TO COMMENCE DURING THE SUMMER OF '78.
NORTHERN STATES POWER CO. SHERBURNE COUNTY STATION NO.4 860 MW - NEW COAL 0.8 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 5/83	TWO ADDITIONAL COAL-FIRED POWER-GENERATING UNITS ARE SCHEDULED TO BE INSTALLED AT NSP'S SHERBURNE COUNTY GENERATING STATION IN BECKER MINNESOTA. COMBUSTION ENGINEERING WAS AWARDED A CONTRACT FOR LIMESTONE SLURRY SPRAY TOWER FGD SYSTEMS ON THE 860 MW UNITS 3 & 4. THE TWO STAGE SCRUBBING MODULES REMOVE PARTICULATE (99.5%) AND SO2 (80%). COMMERCIAL START-UP DATES ARE NOW SCHEDULED FOR MAY 1981 AND MAY 1983. THE BOILER CONTRACT HAS BEEN AWARDED TO BABCOCK AND WILCOX AND THE TURBINE WILL BE SUPPLIED BY GENERAL ELECTRIC.
OTTER TAIL POWER COMPANY COYOTE NO. 1 400 MW - NEW LIGNITE 0.9 PERCENT SULFUR WHEELABRATOR-FRYE/A.I. AQUEOUS CARBONATE/FAB. FILTER STARTUP 5/81	THIS NEW COAL-FIRED STATION IS JOINTLY OWNED BY FIVE UTILITIES. OTTER TAIL POWER IS THE MAJOR OWNER AND CONSTRUCTOR. MONTANA-DAKOTA UTILITIES IS THE FACILITY OPERATOR. THIS PLANNED UNIT WILL FIRE LOW SULFUR LIGNITE FROM THE MERCER COUNTY AREA IN ITS B&W CYCLONE-FIRED BOILER. THE CONTRACT FOR THIS AQUEOUS CARBONATE/FABRIC FILTER SO2 SCRUBBER WAS AWARDED TO WHEELABRATOR-FRYE AND ATOMICS INTERNATIONAL. THE DRY REMOVAL SYSTEM COMBINES THE OPEN LOOP OF AI'S AQUEOUS CARBONATE PROCESS WITH A W-F FABRIC FILTER. PLANT CONSTRUCTION BEGAN SEPT. 77. START-UP IS SET FOR MAY 81.
PACIFIC GAS AND ELECTRIC FOSSIL NO. 1 800 MW - NEW COAL 0.8 PERCENT SULFUR VENDOR NOT SELECTED LIMESTONE STARTUP 0/84	PG&E ANNOUNCED PLANS TO BUILD TWO 800 MW COAL-FIRED POWER GENERATING UNITS IN NORTHERN CALIFORNIA. THE FIRST UNIT WILL BURN COAL WITH A HEATING VALUE OF 12000 BTU/LB, 0.8% SULFUR AND 10% ASH CONTENTS. THE SECOND UNIT WILL BURN COAL OF THE SAME OR BETTER QUALITY. THE EMISSION CONTROL SYSTEM WILL CONSIST OF AN ESP OR BAGHOUSE PARTICULATE STRATEGY WITH A LIMESTONE SO2 ABSORPTION SYSTEM. SLUDGE WILL BE DISPOSED OF IN A CONTROLLED LANDFILL. START-UP DATES ARE 1984 AND 1985 FOR NOS. 1 AND 2 RESPECTIVELY.
PACIFIC GAS AND ELECTRIC FOSSIL NO. 2 800 MW - NEW COAL 0.8 PERCENT SULFUR VENDOR NOT SELECTED LIMESTONE STARTUP 0/85	PG&E ANNOUNCED PLANS TO BUILD TWO 800 MW COAL-FIRED POWER GENERATING UNITS IN NORTHERN CALIFORNIA. THE FIRST UNIT WILL BURN COAL WITH A HEATING VALUE OF 12000 BTU/LB, 0.8% SULFUR AND 10% ASH CONTENTS. THE SECOND UNIT WILL BURN COAL OF THE SAME OR BETTER QUALITY. THE EMISSION CONTROL SYSTEM WILL CONSIST OF AN ESP OR BAGHOUSE PARTICULATE STRATEGY WITH A LIMESTONE SO2 ABSORPTION SYSTEM. SLUDGE WILL BE DISPOSED OF IN A CONTROLLED LANDFILL. START-UP DATES ARE 1984 AND 1985 FOR NOS. 1 AND 2 RESPECTIVELY.
PACIFIC POWER AND LIGHT CO. JIM BRIDGER NO. 4 509 MW - NEW COAL 0.56 PERCENT SULFUR(AVG.) UNIVERSAL OIL PRODUCTS SODIUM CARBONATE STARTUP 9/79	UOP WAS AWARDED A CONTRACT FOR THE INSTALLATION OF THE FGD SYSTEM AT THE NEW 509 MW COAL-FIRED JIM BRIDGER UNIT NO. 4. THE FGD SYSTEM WILL CONSIST OF THREE PARALLEL ABSORBER MODULES, EACH TREATING ONE-THIRD OF THE BOILER FLUE GAS AT FULL LOAD. AN ESP WILL PROVIDE PRIMARY PARTICULATE CONTROL. A CEILCOTE-LINED WET/DRY STACK IS INCLUDED IN THE SYSTEM. PPL'S PILOT STUDY INSPECTION REVEALED SCALE FORMATION PROBLEMS. TESTS ARE BEING CONDUCTED TO RESOLVE THIS PROBLEM. TO DATE, FOUNDATION CONSTRUCTION IS COMPLETE AND VESSEL ERECTION HAS COMMENCED.

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UNIT IDENTIFICATION	CURRENT MONTH
PENNSYLVANIA POWER CO. BRUCE MANSFIELD NO. 1 825 MW - NEW COAL 4.7 PERCENT SULFUR CHEMICO LIME STARTUP 4/76	THIS EMISSION CONTROL SYSTEM WAS DESIGNED TO REMOVE FLYASH AND SO2 FROM 3.35 MM ACFM OF FLUE GAS VIA WET LIME SCRUBBING. THE INITIAL SHAKEDOWN AND DEBUGGING PHASE OF OPERATION BEGAN FOR PART OF THE SYSTEM IN DECEMBER 1975. PARTIAL COMMERCIAL OPERATION COMMENCED IN APRIL 1976. THE UNIT WAS CERTIFIED FULL-LOAD COMMERCIAL IN JUNE 1976. THE FGD SYSTEM HAS EXPERIENCED OPERATIONAL PROBLEMS SINCE IT HAS BEEN IN SERVICE REQUIRING A NUMBER OF SYSTEM REPAIRS AND DESIGN MODIFICATIONS. REFER TO BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT FOR GREATER DETAIL.
PENNSYLVANIA POWER CO. BRUCE MANSFIELD NO. 2 825 MW - NEW COAL 4.7 PERCENT SULFUR CHEMICO LIME STARTUP 7/77	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS EMISSION CONTROL SYSTEM WAS DESIGNED TO REMOVE FLYASH AND SO2 FROM 3.35 MM ACFM OF FLUE GAS USING THIOSORBIC LIME AS A SCRUBBING ABSORBENT. SIX SCRUBBING TRAINS, EACH INCLUDING TWO VENTURI SCRUBBERS IN SERIES ARRANGEMENT, ARE PROVIDED FOR FULL-LOAD OPERATION. THE INITIAL SHAKEDOWN AND DEBUGGING PHASE OF OPERATION BEGAN FOR THREE TRAINS IN JULY, 1977. FULL COMMERCIAL OPERATION FOR THE ENTIRE SYSTEM COMMENCED ON OCTOBER 1, 1977.
PENNSYLVANIA POWER CO. BRUCE MANSFIELD NO. 3 825 MW - NEW COAL 4.7 PERCENT SULFUR PULLMAN KELLOGG LIME STARTUP 4/80	THE PULLMAN KELLOGG DIVISION OF PULLMAN INCORPORATED HAS BEEN AWARDED A CONTRACT IN EXCESS OF $50 MILLION BY THE CAPCO CONSORTIUM FOR THE INSTALLATION OF SULFUR DIOXIDE ABSORBERS ON THIS 825 MW COAL-FIRED POWER-GENERATING UNIT. THE EMISSION CONTROL SYSTEM FOR THIS UNIT WILL CONSIST OF ESP'S UPSTREAM OF FIVE WEIR HORIZONTAL CROSSFLOW WET SCRUBBING MODULES. CONSTRUCTION OF THE BOILER IS CURRENTLY IN PROGRESS. DUE TO REVISED CAPCO FORECASTS, UNIT START-UP HAS BEEN MOVED BACK TO APRIL 1980.
PHILADELPHIA ELECTRIC CO. CROMBY 150 MW - RETROFIT COAL 2-4 PERCENT SULFUR UNITED ENGINEERS / PECO MAGNESIUM OXIDE STARTUP 6/80	THE UTILITY PLANS TO RETROFIT ONE OF THE TWO BOILERS AT CROMBY WITH AN FGD SYSTEM. HOWEVER, A FINAL DECISION HAS NOT BEEN MADE. THE PROCESS BEING GIVEN PRIME CONSIDERATION IS MAGNESIUM OXIDE SCRUBBING, DESIGNED JOINTLY BY UNITED ENGINEERS AND PHILADELPHIA ELECTRIC. ENGINEERING DESIGN WORK IS SCHEDULED TO COMMENCE SOON. TENTATIVE FGD SYSTEM START-UP IS SCHEDULED FOR JUNE 1980. CURRENTLY, PECO IS CONTINUING PROCESS EVALUATION STUDIES AT THE EDDYSTONE EXPERIMENTAL UNIT.
PHILADELPHIA ELECTRIC CO. EDDYSTONE NO. 1A 120 MW - RETROFIT COAL 2.5 PERCENT SULFUR UNITED ENGINEERS / PECO MAGNESIUM OXIDE STARTUP 9/75	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF THREE PARALLEL SCRUBBING TRAINS FOR THE CONTROL OF PARTICULATE AND SULFUR DIOXIDE. THE C-SIDE SCRUBBING TRAIN INCLUDES AN SO2 ABSORBER MODULE IN SERIES WITH A PARTICULATE SCRUBBER. APPROXIMATELY ONE-THIRD OF THE BOILER FLUE GAS IS SCRUBBED WITH MAGNESIUM OXIDE SLURRY FOR SO2 REMOVAL. THE SPENT SLURRY IS REGENERATED AT THE ESSEX SULFURIC ACID PLANT IN NEWARK, N.J. THE REGENERATED MAGOX IS RETURNED TO THE PLANT FOR SO2 SCRUBBING SERVICE.
PHILADELPHIA ELECTRIC CO. EDDYSTONE NO. 1B 240 MW - RETROFIT COAL 2.5 PERCENT SULFUR UNITED ENGINEERS / PECO MAGNESIUM OXIDE STARTUP 6/80	THE INSTALLATION OF SO2 SCRUBBERS ON THE BALANCE OF THE FLUE GAS FROM THIS UNIT WILL FOLLOW PENDING THE OUTCOME OF THE PERFORMANCE OF THE SCRUBBING UNIT WHICH HAS BEEN INSTALLED AND CURRENTLY OPERATIONAL ON THE EDDYSTONE NO. 1 UNIT. CURRENTLY, 3 WET PARTICULATE SCRUBBERS ARE TREATING THE FULL GAS LOAD FROM THIS UNIT. THE PERFORMANCE OF THE MAGOX UNIT IS DESCRIBED IN THE EDDYSTONE NO. 1A FILE CONTAINED IN THIS REPORT.
PHILADELPHIA ELECTRIC CO. EDDYSTONE NO. 2 334 MW - RETROFIT COAL 2.4 PERCENT SULFUR UNITED ENGINEERS / PECO MAGNESIUM OXIDE STARTUP 6/80	THE UTILITY IS AWAITING PERFORMANCE RESULTS FROM THE EXISTING MGO SCRUBBER INSTALLED ON UNIT NO. 1 AT THIS STATION BEFORE PROCEEDING WITH THE DESIGN OF AN FGD SYSTEM FOR THIS COAL-FIRED BOILER. THE PROCESS BEING GIVEN PRIME CONSIDERATION IS MAGNESIUM OXIDE SCRUBBING DESIGNED JOINTLY BY UNITED ENGINEERS AND PHILADELPHIA ELECTRIC. ENGINEERING DESIGN WORK IS SCHEDULED TO COMMENCE SOON. TENTATIVE FGD SYSTEM START-UP IS SCHEDULED FOR JUNE 1980.
POTOMAC ELECTRIC & POWER DICKERSON NO. 4 800 MW - NEW COAL 2.0 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 5/85	THERE ARE NO FIRM PLANS FOR INSTALLATION OF FGD SYSTEM. STARTUP DATE OF BOILER IS PLANNED FOR 1985. THIS UNIT WILL BURN 2 PERCENT SULFUR COAL WITH A HEATING VALUE OF 11,000 BTU/LB.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
PORT AUTHORITY OF NEW YORK . ARTHUR KILL 2 AND 3 800 MW - NEW COAL - 3% SULFUR - REFUSE VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 11/84	THE UTILITY IS CONSIDERING BOTH REGENERABLE AND LIMESTONE SCRUBBING PROCESSES. FGD TECHNOLOGY IS BEING CONSIDERED FOR A FOSSIL FUEL BURNING UNIT WHICH WILL EMPLOY COAL AS THE PRIMARY FUEL AND OIL AS BACKUP. REFUSE WILL BE PROVIDED FOR SUPPLEMENTAL FUEL SUPPLIES. THE PREFERRED PLANT SITE IS THE ARTHUR KILL FACILITY LOCATED ON STATEN ISLAND. THE PROJECT DESIGN ENGINEERING FIRM IS SARGENT AND LUNDY. PUBLIC SERVICE COMMISSION HEARINGS ARE IN PROGRESS. NO DECISIONS WILL BE MADE UNTIL LATE SPRING 1978.
PUBLIC SERVICE CO OF NEW MEX. SAN JUAN NO. 1 375 MW - NEW COAL 0.8 PERCENT SULFUR DAVY POWERGAS/ALLIED CHEMICAL WELLMAN LORD/ALLIED CHEMICAL STARTUP 4/76	CONSTRUCTION IS COMPLETE. THIS FGD SYSTEM IS AN INTEGRATION OF THE WELLMAN LORD SO2 RECOVERY PROCESS OF DAVY POWERGAS AND ALLIED CHEMICAL'S SO2 REDUCTION TO SULFUR PROCESS. A HOT SIDE ELECTROSTATIC PRECIPITATOR WILL PRECEDE THE SCRUBBING UNIT. FOUR ABSORBER TOWERS WILL BE INSTALLED FOR EACH UNIT. THREE WILL CARRY THE FULL LOAD. MOLTEN SULFUR WILL BE STORED ON THE PLANT SITE. THE INSTRUMENTATION CONTROL PROBLEM PREVIOUSLY REPORTED HAS BEEN SOLVED. FLUE GAS FIRST ENTERED THE FGD SYSTEM APRIL 8, 1978. FULL COMMERCIAL OPERATION IS EXPECTED IN LATE JUNE.
PUBLIC SERVICE CO OF NEW MEX. SAN JUAN NO. 2 340 MW - RETROFIT COAL 0.8 PERCENT SULFUR DAVY POWERGAS/ALLIED CHEMICAL WELLMAN LORD/ALLIED CHEMICAL STARTUP 7/78	THE CONSTRUCTION OF THIS SYSTEM IS NOW UNDERWAY. CONSTRUCTION IS NEARING COMPLETION. START-UP IS NOW SCHEDULED FOR JULY 1978. THIS FGD SYSTEM IS AN INTEGRATION OF THE WELLMAN LORD SO2 RECOVERY PROCESS OF DAVY POWERGAS AND ALLIED CHEMICAL'S SO2 REDUCTION TO SULFUR PROCESS. A HOT SIDE ELECTROSTATIC PRECIPITATOR WILL PRECEDE THE SCRUBBING UNIT. FOUR ABSORBER TOWERS WILL BE INSTALLED FOR THIS UNIT. THREE WILL CARRY THE FULL LOAD. MOLTEN SULFUR WILL BE STORED ON THE PLANT SITE. START-UP DELAY WAS CAUSED BY A BOILER EXPLOSION.
PUBLIC SERVICE CO OF NEW MEX. SAN JUAN NO. 3 500 MW - NEW COAL 0.8 PERCENT SULFUR DAVY POWERGAS WELLMAN LORD STARTUP 1/79	THE UTILITY AWARDED A CONTRACT TO DAVY POWERGAS FOR ONE SCRUBBER MODULE WHICH WILL BE DESIGNED TO BRING THE UNIT INTO COMPLIANCE WITH NSPS BY JAN. 1979. THE FGD SYSTEM FOR THE REMAINDER OF THE FLUE GAS FROM THIS 500-MW UNIT HAS NOT BEEN SELECTED. PRIMARY PARTICULATE CONTROL WILL BE EFFECTED BY AN UPSTREAM ESP. THE SINGLE MODULE IS CURRENTLY UNDER CONSTRUCTION.
PUBLIC SERVICE CO OF NEW MEX. SAN JUAN NO. 4 500 MW - NEW COAL 0.8 PERCENT SULFUR DAVY POWERGAS WELLMAN LORD STARTUP 5/81	THE UTILITY HAS PLACED A HOLD ON FURTHER ENGINEERING DESIGN WORK AT THE PRESENT TIME. THE PROJECTED START-UP DATE FOR UNIT 4 IS MAY 1981. THE WELLMAN LORD SO2 RECOVERY PROCESS WILL BE UTILIZED TO BRING THE UNIT INTO COMPLIANCE WITH NSPS. AN ESP WILL BE PROVIDED UPSTREAM OF THE FGD SYSTEM FOR PRIMARY PARTICULATE CONTROL.
PUBLIC SERVICE OF INDIANA GIBSON 5 650 MW - NEW COAL 3.3 PERCENT SULFUR VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 8/82	THE UTILITY IS IN THE PROCESS OF PREPARING SPECIFICATIONS. SCHEDULED START-UP OF THIS 650 MW UNIT IS 1982.
SALT RIVER PROJECT CORONADO NO.1 350 MW - NEW COAL 1.0 PERCENT SULFUR (MAX) PULLMAN KELLOGG LIMESTONE STARTUP 4/79	THIS NEW UNIT WILL BURN LOW SULFUR WESTERN COAL. A MAXIMUM OF 80% OF THE FLUE GAS WILL BE SCRUBBED TO MEET SULFUR DIOXIDE EMISSION REGULATIONS. PULLMAN/KELLOGG WILL DESIGN AND FABRICATE TWO WEIR HORIZONTAL CROSSFLOW SCRUBBER MODULES, WHICH WILL UTILIZE LIMESTONE SLURRY FOR SO2 CONTROL. THE SYSTEM WILL UTILIZE RUBBER-LINED SLURRY RECYCLE PUMPS, EACH RATED AT 9800 GPM, MIGIFLAKE-LINED SCRUBBER MODULES, VERTICAL HEIL MIST ELIMINATORS, AND A MINIMUM OF 20 PERCENT REHEAT. THE SLUDGE WILL BE PONDED. THE FOUNDATION IS COMPLETED AND STRUCTURAL WORK HAS COMMENCED.
SALT RIVER PROJECT CORONADO NO.2 350 MW - NEW COAL 1.0 PERCENT SULFUR (MAX) PULLMAN KELLOGG LIMESTONE STARTUP 4/80	THIS NEW UNIT WILL BURN LOW SULFUR WESTERN COAL. A MAXIMUM OF 80% OF THE FLUE GAS WILL BE SCRUBBED TO MEET SULFUR DIOXIDE EMISSION REGULATIONS. PULLMAN/KELLOGG WILL DESIGN AND FABRICATE TWO WEIR HORIZONTAL CROSSFLOW SCRUBBER MODULES, WHICH WILL UTILIZE LIMESTONE SLURRY FOR SO2 CONTROL. THE SYSTEM WILL UTILIZE RUBBER-LINED SLURRY RECYCLE PUMPS, EACH RATED AT 9800 GPM, MIGIFLAKE-LINED SCRUBBER MODULES, VERTICAL HEIL MIST ELIMINATORS, AND A MINIMUM OF 20 PERCENT REHEAT. THE SLUDGE WILL BE PONDED. THE FOUNDATION IS COMPLETED AND STRUCTURAL WORK HAS BEGUN.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
SALT RIVER PROJECT CORONADO NO.3 550 MW - NEW COAL 1.0 PERCENT SULFUR (MAX) VENDOR NOT SELECTED LIMESTONE STARTUP 8/82	THIS NEW UNIT WILL BURN LOW SULFUR WESTERN COAL. 80 PERCENT OF THE GAS WILL BE SCRUBBED TO MEET SULFUR DIOXIDE EMISSION REGULATIONS. THE UTILITY IS CURRENTLY CONSIDERING THE INSTALLATION OF TWO HORIZONTAL CROSSFLOW SCRUBBING MODULES EMPLOYING A LIMESTONE SCRUBBING SOLUTION TO REMOVE SO2 FROM THE FLUE GAS. SCHEDULED COMMERCIAL OPERATION DATE IS 1982. PLANS FOR AN EMISSION CONTROL SYSTEM HAVE NOT BEEN FINALIZED. SLUDGE WILL PROBABLY BE PONDED.
SOUTH CAROLINA PUBLIC SERVICE WINYAH NO. 2 280 MW - NEW COAL 1.0 PERCENT SULFUR BABCOCK & WILCOX LIMESTONE STARTUP 7/77	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A 100% CAPACITY ESP FOLLOWED BY A 50% CAPACITY LIMESTONE FGD SYSTEM. ONE FGD MODULE, CONSISTING OF A VENTURI SCRUBBER AND TRAY TOWER ABSORBER, REMOVES 70% OF THE INLET SO2. REHEAT IS SUPPLIED BY THE FLUE GAS BYPASS. THE SCRUBBING WASTES ARE DISCHARGED TO AN ON-SITE, UNLINED DIKED POND. THE NO. 2 UNIT COMMENCED INITIAL OPERATIONS IN JULY 1977. THE ACCEPTANCE TEST FOR COMMERCIAL CERTIFICATION WAS SUCCESSFULLY COMPLETED IN DECEMBER 1977.
SOUTH CAROLINA PUBLIC SERVICE WINYAH NO. 3 500 MW - NEW COAL 2.5 PERCENT SULFUR BABCOCK & WILCOX PROCESS NOT SELECTED STARTUP 5/80	A CONTRACT HAS BEEN AWARDED TO BABCOCK AND WILCOX FOR THE INSTALLATION OF AN FGD SYSTEM AT THIS PLANT. PARTICULATE REMOVAL WILL BE PROVIDED BY RESEARCH COTTRELL ESP'S. THIS IS A STEAM GENERATING UNIT WITH A 300 MW RATING. THE FURNACE IS COAL-FIRED DRY-BOTTOM AND WILL BURN COAL WITH A 2.3% SULFUR CONTENT AND HEAT VALUE OF 11,500 BTU/LB. THE GENERATING EQUIPMENT IS BEING SUPPLIED BY RILEY STOKER. 80% OF THE FLUE GAS WILL BE SCRUBBED FOR SO2, 20% WILL BE BYPASSED FOR REHEAT. FGD SYSTEM CONSTRUCTION WILL BEGIN IN JUNE '78 AND START-UP IS SCHEDULED FOR MAY, 1980.
SOUTHERN ILLINOIS POWER COOP MARION NO. 4 184 MW - NEW COAL 0.5-5.0 PERCENT SULFUR BABCOCK & WILCOX LIMESTONE STARTUP 6/78	THE EMISSION CONTROL SYSTEM FOR THIS NEW COAL-FIRED BOILER CONSISTS OF AN ESP FOR PARTICULATE CONTROL FOLLOWED BY 2 SPRAY TOWERS FOR SO2 CONTROL. LIMESTONE SLURRY WILL BE USED AS THE SCRUBBING REAGENT. SIPC IS NOT PLANNING TO UTILIZE FLUE GAS REHEAT AND IS CURRENTLY PLANNING ON BRICK LINING FOR THE STACK. SIPC INTENDS TO USE A LANDFILL WITH ASH STABILIZATION OF WASTE FOR SLUDGE DISPOSAL. CURRENTLY, CONSTRUCTION IS NEARLY 100% COMPLETE AND THE SYSTEM HAS BEEN AIR TESTED. START-UP IS STILL SCHEDULED FOR JUNE, 1978.
SOUTHERN INDIANA GAS&ELECTRIC A.B. BROWN NO.1 250 MW - NEW COAL 3.75 PERCENT SULFUR FMC CORPORATION DOUBLE ALKALI STARTUP 4/79	THE UTILITY HAS AWARDED A CONTRACT TO FMC FOR THE INSTALLATION OF A DOUBLE ALKALI SCRUBBING SYSTEM UTILIZING SODA ASH AND LYE. THIS UNIT IS A PART OF A NEW POWER STATION LOCATED IN WEST FRANKLIN, INDIANA. THE SYSTEM WILL PRODUCE FILTER CAKE AS A WASTE PRODUCT WHICH WILL BE DISPOSED OF IN AN ON-SITE LANDFILL. THE PARTICULATE EMISSIONS WILL BE CONTROLLED BY A BUELL-ENVIROTECH COLD-SIDE ESP. THE CONSTRUCTION WORK AND ENGINEERING IS 20% COMPLETE.
SOUTHERN MISSISSIPPI ELECTRIC R.D. MORROW NO.1 180 MW - NEW COAL 1.0 PERCENT SULFUR RILEY STOKER / ENVIRONEERING LIMESTONE STARTUP 5/78	CONSTRUCTION OF THE WET LIMESTONE SCRUBBING SYSTEM IS 75 PERCENT COMPLETE. PARTICULATES WILL BE CONTROLLED BY A HIGH-EFFICIENCY ESP UPSTREAM OF THE SCRUBBING SYSTEM. DESIGN SULFUR DIOXIDE AND PARTICULATE REMOVAL EFFICIENCIES ARE 85 AND 99.6 PERCENT, RESPECTIVELY. A WATER SPRAY HAS BEEN ADDED IN THE BY-PASS DUCT TO PROTECT THE LINER FROM TEMPERATURE EXCURSION. SCRUBBER SLUDGE WILL BE STABILIZED WITH FLYASH AND DISPOSED ON THE PLANT SITE.
SOUTHERN MISSISSIPPI ELECTRIC R.D. MORROW NO.2 180 MW - NEW COAL 1.0 PERCENT SULFUR RILEY STOKER / ENVIRONEERING LIMESTONE STARTUP 4/78	CONSTRUCTION OF THE WET LIMESTONE SCRUBBING SYSTEM IS 50 PERCENT COMPLETE. PARTICULATES WILL BE CONTROLLED BY A HIGH-EFFICIENCY ESP UPSTREAM OF THE SCRUBBING SYSTEM. DESIGN SULFUR DIOXIDE AND PARTICULATE REMOVAL EFFICIENCIES ARE 85 AND 99.6 PERCENT, RESPECTIVELY. A WATER SPRAY HAS BEEN ADDED IN THE BY-PASS DUCT TO PROTECT THE LINER FROM TEMPERATURE EXCURSION. SCRUBBER SLUDGE WILL BE STABILIZED WITH FLYASH AND DISPOSED ON THE PLANT SITE.
SPRINGFIELD CITY UTILITIES SOUTHEAST NO. 1 200 MW - NEW COAL 3.5 PERCENT SULFUR UNIVERSAL OIL PRODUCTS LIMESTONE STARTUP 4/77	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE EMISSION CONTROL SYSTEM FOR THIS NEW COAL-FIRED UNIT CONSISTS OF A FOUR-FIELD HIGH EFFICIENCY ESP (99.6% DESIGN) AND 2 TURBULENT CONTACT ABSORBER MODULES (80% DESIGN) FOR THE CONTROL OF PARTICULATES AND SO2. BOTH THE ESP AND LIMESTONE FGD SYSTEM ARE SUPPLIED BY UOP. THE SCRUBBING WASTES ARE DEWATERED BY A ROTARY DRUM VACUUM FILTER AND THE FILTER CAKE IS HAULED AWAY TO A LANDFILL. INITIAL OPERATION OF THE FGD SYSTEM OCCURRED IN APRIL 77. IN SEPT. 77, THE UNIT SUCCESSFULLY COMPLETED COMPLIANCE TESTING.

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SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
SPRINGFIELD WATER LIGHT&POWER DALLMAN NO. 5 190 MW = NEW COAL 3.0-4.5 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 7/80	A CONTRACT HAS BEEN AWARDED TO RESEARCH COTTRELL FOR THE INSTALLATION OF A LIMESTONE SCRUBBING SYSTEM. REQUIRED SULFUR DIOXIDE REMOVAL EFFICIENCY IS 90 PERCENT. A SLUDGE DISPOSAL STRATEGY HAS NOT BEEN FINALIZED, BUT THE UTILITY IS CONSIDERING EITHER PONDING OR LANDFILL. SCRUBBER CONSTRUCTION OF THE FGD SYSTEM SHOULD COMMENCE IN LATE 1978. FGD START-UP IS SCHEDULED FOR JULY 1980. BOILER OPERATION IS SCHEDULED TO COMMENCE IN JUNE 1978.
TENNESSEE VALLEY AUTHORITY SHAWNEE NO.10A 10 MW = RETROFIT COAL 2.9 PERCENT SULFUR UNIVERSAL OIL PRODUCTS LIME/LIMESTONE STARTUP 4/76	REFER TO BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS TURBULENT CONTACT ABSORBER (TCA) LIME/LIMESTONE SCRUBBING SYSTEM HAS BEEN OPERATIONAL SINCE APRIL 1972. THIS TEST PROGRAM IS FUNDED BY THE EPA. TVA IS THE CONSTRUCTOR AND FACILITY OPERATOR. THE BECHTEL CORP. OF SAN FRANCISCO IS THE MAJOR CONTRACTOR, TEST DIRECTOR, AND REPORT WRITER. DURING THE REPORT PERIOD, OPERATIONS WERE CONDUCTED WITH LIMESTONE SLURRY CIRCULATING THROUGH THE UNIT. FORCED OXIDATION ON FLY ASH-LADEN FLUE GAS WAS EVALUATED.
TENNESSEE VALLEY AUTHORITY SHAWNEE NO.10B 10 MW = RETROFIT COAL 2.9 PERCENT SULFUR CHEMICO LIME/LIMESTONE STARTUP 4/72	REFER TO BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THIS VENTURI/SPRAY TOWER LIME/LIMESTONE SCRUBBING SYSTEM HAS BEEN OPERATIONAL SINCE APRIL 1972. THIS TEST PROGRAM IS FUNDED BY THE EPA. TVA IS THE CONSTRUCTOR AND FACILITY OPERATOR. THE BECHTEL CORP. OF SAN FRANCISCO IS THE MAJOR CONTRACTOR, TEST DIRECTOR, AND REPORT WRITER. DURING THE REPORT PERIOD, FORCED OXIDATION WAS EVALUATED ON FLY ASH-FREE FLUE GAS WITH LIME SLURRY AS THE SCRUBBING AGENT.
TENNESSEE VALLEY AUTHORITY WIDOWS CREEK NO. 7 575 MW = RETROFIT COAL 3.7 PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 9/ 0	TENNESSEE VALLEY AUTHORITY ANNOUNCED DURING THE REPORT PERIOD THAT A CONTRACT HAS BEEN AWARDED TO COMBUSTION ENGINEERING FOR A LIMESTONE SLURRY SPRAY TOWER FGD SYSTEM. THE FGD SYSTEM WILL TREAT HIGH SULFUR COAL FLUE GAS. THE SPRAY TOWER ABSORBERS WILL BE CONSTRUCTED OF 317L STAINLESS STEEL. THE NO. 7 UNIT FIRES COAL WITH THE SAME CHARACTERISTICS AS THE COAL FIRED IN THE NO. 8 UNIT.
TENNESSEE VALLEY AUTHORITY WIDOWS CREEK NO. 8 550 MW = RETROFIT COAL 3.7 PERCENT SULFUR TENNESSEE VALLEY AUTHORITY LIMESTONE STARTUP 5/77	REFER TO THE BACKGROUND INFORMATION SECTION IN TABLE 3 OF THIS REPORT. THE EMISSION CONTROL SYSTEM FOR THIS 550-MW COAL-FIRED POWER-GENERATING UNIT CONSISTS OF EXISTING ELECTROSTATIC PRECIPITATORS FOLLOWED BY FOUR PARALLEL SCRUBBING TRAINS, EACH CAPABLE OF HANDLING 25 PERCENT OF THE BOILER FLUE GAS FROM UNIT NO. 8. EACH TRAIN INCLUDES A RECTANGULAR-THROAT VENTURI SCRUBBER AND A GRID-TOWER ABSORBER SUPPLIED BY POLYCON. THE GRID TOWER CAN BE CONVERTED TO A MOBILE-BED TOWER IF GREATER SO2 REMOVAL IS REQUIRED.
TEXAS MUNICIPAL POWER AGENCY GIBBONS CREEK UNIT NO. 1 400 MW = NEW LIGNITE - 1.0% PERCENT SULFUR COMBUSTION ENGINEERING LIMESTONE STARTUP 1/82	COMBUSTION ENGINEERING WAS AWARDED A CONTRACT TO DESIGN AND SUPPLY A 400 MW LIGNITE-FIRED BOILER, ESP, AND FGD SYSTEM AT GIBBONS CREEK STEAM ELECTRIC STATION UNIT NO. 1. THE BOILER WILL BURN 1.0% SULFUR LIGNITE. FLUE GAS WILL BE CLEANED OF PARTICULATES BY A COLD-SIDE ESP (99.7% EFFICIENCY). SO2 WILL BE REMOVED BY 3 SPRAY TOWER MODULES UTILIZING A LIMESTONE SLURRY (72.5 TO 87.5% EFFICIENCY). A CONTRACT HAS BEEN AWARDED TO IUCS FOR SLUDGE DISPOSAL. COMMERCIAL START-UP HAS BEEN SET FOR JANUARY 1982.
TEXAS POWER AND LIGHT CO. SANDOW NO.4 545 MW = NEW LIGNITE COMBUSTION ENGINEERING LIMESTONE STARTUP 7/80	COMBUSTION ENGINEERING HAS BEEN CHOSEN AS THE BOILER AND FGD VENDOR FOR THIS UNIT. BOILER CONSTRUCTION BEGAN ON SEPTEMBER 9, 1977. THE PARTICULATE REMOVAL IS TO TAKE PLACE ON THE COLD-SIDE OF THE AIR HEATER. SOME PORTION OF FLUE GAS WILL BYPASS SCRUBBER FOR REHEAT. THE SPENT SLURRY WILL BE PONDED AND WATER RECYCLED. FGD CONSTRUCTION IS SCHEDULED TO BEGIN NOVEMBER 1978.
TEXAS POWER AND LIGHT CO. TWIN OAKS NO. 1 750 MW = NEW LIGNITE VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 8/83	THIS UNIT WILL BE JOINTLY OWNED BY TP&L AND ALCOA. A FIRM DECISION HAS NOT BEEN MADE WHETHER TO INSTALL FGD FACILITIES. THIS IS PRIMARILY DUE TO THE FACT THAT SUCH A DECISION IS NOT YET REQUIRED IN THE UTILITIES PLANNING TIMETABLE.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
TEXAS POWER AND LIGHT CO. TWIN OAKS NO. 2 750 MW - NEW LIGNITE VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 9/84	THIS UNIT WILL BE JOINTLY OWNED BY TP&L AND ALCOA. A FIRM DECISION HAS NOT BEEN MADE WHETHER TO INSTALL FGD FACILITIES. THIS IS PRIMARILY DUE TO THE FACT THAT SUCH A DECISION IS NOT YET REQUIRED IN THE UTILITIES PLANNING TIMETABLE.
TEXAS UTILITIES CO. FOREST GROVE NO. 1 750 MW - NEW LIGNITE VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 0/81	TEXAS UTILITIES REPORTED THAT A NEW 750-MW LIGNITE-FIRED UNIT IS IN THE EARLY PLANNING STAGE FOR THE FOREST GROVE STATION IN ATHENS, TEXAS. START-UP IS SCHEDULED FOR LATE 1981. THE BOILER WILL BE SUPPLIED BY THE BABCOCK & WILCOX COMPANY.
TEXAS UTILITIES CO. MARTIN LAKE NO. 1 793 MW - NEW COAL 1.0 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 8/77	THIS NEW 793-MW POWER GENERATING UNIT FIRES TEXAS LIGNITE WHICH CONTAINS 0.9% SULFUR (AVG) AND 8.0% ASH (AVG.). IN ORDER TO MEET FEDERAL NSPS THE UNIT HAS BEEN EQUIPPED WITH AN EMISSION CONTROL SYSTEM WHICH INCLUDES COLD-SIDE ESP'S AND A LIMESTONE FGD SYSTEM BOTH SUPPLIED BY RESEARCH-COTTRELL. THE FGD SYSTEM CONSISTS OF 6 PACKED/SPRAY TOWER ABSORBERS WHICH TREAT 75% OF THE TOTAL BOILER FLUE GAS. THE REMAINING FLUE GAS IS BYPASSED FOR REHEAT. TOTAL SO2 REMOVAL EFFICIENCY IS 70.5%. THE FLUE GAS CLEANING WASTES ARE STABILIZED AND DISPOSED IN AN ON-SITE, LINED POND.
TEXAS UTILITIES CO. MARTIN LAKE NO. 2 793 MW - NEW COAL 1.0 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 2/78	THIS NEW 793-MW POWER GENERATING UNIT FIRES TEXAS LIGNITE CONTAINING 0.9% SULFUR (AVG.) AND 8% ASH (AVG.). TO MEET FEDERAL NSPS, THE UNIT WILL BE EQUIPPED WITH AN EMISSION CONTROL SYSTEM CONSISTING OF COLD-SIDE ESP'S AND A LIMESTONE FGD SYSTEM, BOTH SUPPLIED BY RESEARCH-COTTRELL. THE FGD SYSTEM CONSISTS OF 6 PACKED/SPRAY TOWER ABSORBERS WHICH WILL TREAT 75% OF THE TOTAL BOILER FLUE GAS. THE REMAINING GAS WILL BE BYPASSED FOR REHEAT. TOTAL DESIGN SO2 REMOVAL EFFICIENCY IS 70.5%. THE FLUE GAS CLEANING WASTES WILL BE STABILIZED AND DISPOSED IN AN ON-SITE, LINED POND.
TEXAS UTILITIES CO. MARTIN LAKE NO. 3 793 MW - NEW COAL 1.0 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 12/78	THIS NEW 793-MW POWER GENERATING UNIT WILL FIRE TEXAS LIGNITE CONTAINING 0.9% SULFUR (AVG.) AND 8% ASH (AVG.). TO MEET FEDERAL NSPS, THE UNIT WILL BE EQUIPPED WITH AN EMISSION CONTROL SYSTEM CONSISTING OF COLD-SIDE ESP'S AND A LIMESTONE FGD SYSTEM, BOTH SUPPLIED BY RESEARCH-COTTRELL. THE FGD SYSTEM CONSISTS OF 6 PACKED/SPRAY TOWER ABSORBERS WHICH WILL TREAT 75% OF THE TOTAL BOILER FLUE GAS. THE REMAINING GAS WILL BE BYPASSED FOR REHEAT. TOTAL DESIGN SO2 REMOVAL EFFICIENCY IS 70.5%. THE FLUE GAS CLEANING WASTES WILL BE STABILIZED AND DISPOSED IN AN ON-SITE, LINED POND.
TEXAS UTILITIES CO. MARTIN LAKE NO. 4 793 MW - NEW COAL 1.0 PERCENT SULFUR RESEARCH COTTRELL LIMESTONE STARTUP 11/82	THE CONTRACT FOR THIS FGD SYSTEM HAS BEEN AWARDED TO RESEARCH-COTTRELL. THE BOILER IS NOW BEING ERECTED. START-UP IS SCHEDULED FOR THE FOURTH QUARTER OF 1982.
TEXAS UTILITIES CO. MONTICELLO NO.3 750 MW - NEW LIGNITE 1.5 PERCENT SULFUR CHEMICO LIMESTONE STARTUP 2/78	THE EMISSION CONTROL SYSTEM FOR THIS UNIT CONSISTS OF A HIGH EFFICIENCY ESP AND A LIMESTONE FGD SYSTEM. THE ESP (POLLUTION CONTROL-WALTHER) IS PROVIDED FOR PRIMARY PARTICULATE CONTROL (99.56%). THE FGD SYSTEM CONSISTS OF LIMESTONE SCRUBBING SPRAY TOWERS (CHEMICO) AND WILL PROVIDE PRIMARY SO2 CONTROL (74%). THE FGD SYSTEM IS DESIGNED TO TREAT APPROXIMATELY 3MM SCFM OF FLUE GAS RESULTING FROM COAL WITH 1.5% SULFUR, 18.9% ASH AND 0.04% CL. THE FLUE GAS CLEANING WASTES WILL BE STABILIZED AND DISPOSED IN AN ON-SITE, LINED POND. BOILER PROBLEMS HAVE DELAYED START-UP.
UTAH POWER & LIGHT CO. EMERY NO.1 400 MW - NEW COAL 0.5 PERCENT SULFUR CHEMICO LIME STARTUP 12/78	A CONTRACT HAS BEEN AWARDED TO THE CHEMICO AIR POLLUTION DIVISION FOR A PEBBLE LIME WET SCRUBBING SYSTEM ON THIS NEW UNIT. THE SCRUBBING SYSTEM IS DESIGNED TO OPERATE IN AN OPEN WATER LOOP MODE WITH AN SO2 REMOVAL EFFICIENCY OF 80 PERCENT FOR LOW SULFUR UTAH COAL. PRIMARY PARTICULATE CONTROL WILL BE PROVIDED BY AN ESP UPSTREAM OF THE SCRUBBERS. THE SCRUBBER SLUDGE WILL BE STABILIZED WITH FLYASH AND DISPOSED ON THE PLANT SITE. THE A-E DESIGN FIRM FOR THIS PROJECT IS STEARNS-ROGER. CONSTRUCTION IS NOW APPROXIMATELY 50% COMPLETE AT THIS UNIT.

SECTION 2
STATUS OF FGD SYSTEMS AS OF 03/78

UNIT IDENTIFICATION	CURRENT MONTH
UTAH POWER & LIGHT CO. HUNTINGTON NO.1 415 MW - NEW COAL 0.5 PERCENT SULFUR CHEMICO LIME STARTUP 5/78	A CONTRACT WAS AWARDED TO CHEMICO AIR POLLUTION DIVISION FOR A LIME SCRUBBING SYSTEM ON THIS NEW UNIT. THE STATE OF UTAH REGULATIONS REQUIRE THE BEST AVAILABLE AND MOST COST EFFECTIVE TECHNOLOGY FOR SULFUR DIOXIDE REMOVAL. PRIMARY PARTICULATE REMOVAL WILL BE PROVIDED BY AN ESP INSTALLED UPSTREAM OF THE WET SCRUBBING SYSTEM. CONSTRUCTION IS COMPLETE WITH THE EXCEPTION OF SOME FINAL DUCTWORK INSTALLATION. START-UP WILL BE MAY 1, 1978. THE TURNKEY COST FOR THE TWO FGD SYSTEMS (EMERY NO.1 AND HUNTINGTON NO.1) IS $29 MM AND $28 MM RESPECTIVELY.
VIRGINIA ELECTRIC AND POWER CO MT. STORM 1167 MW - RETROFIT COAL VENDOR NOT SELECTED PROCESS NOT SELECTED STARTUP 07 0	THE UTILITY IS CURRENTLY WAITING FOR AN EPA DECISION REGARDING A WEST VIRGINIA STATE EMISSION CONTROL PROPOSAL. PLANS FOR SULFUR DIOXIDE CONTROL ARE TEMPORARILY AT A STANDSTILL PENDING THIS DECISION. NO CONSTRUCTION OR STARTUP DATES HAVE, THEREFORE, BEEN SET.
WISCONSIN POWER & LIGHT CO. COLUMBIA NO. 2 527 MW - NEW COAL 0.8 PERCENT SULFUR CHEMICO LIME/ALKALINE FLYASH STARTUP 1/80	A CONTRACT HAS BEEN AWARDED TO CHEMICO FOR A LIME/FLYASH FGD SYSTEM. IT WILL CONSIST OF TWO SPRAY MODULES WITH A HOT-SIDE ESP FOR PARTICULATE REMOVAL. A CLOSED LOOP WATER SYSTEM IS ANTICIPATED WITH FLYASH STABILIZATION OF THE SLUDGE. A SLUDGE DISPOSAL POND LOCATED OFF-SITE IS BEING CONSIDERED. THE SCRUBBERS ARE BEING DESIGNED TO TREAT 60% OF THE FLUE GAS RESULTING FROM THE COMBUSTION OF LOW SULFUR COLSTRIP COAL. THE REMAINING 40% WILL BE BYPASSED FOR REHEAT. CURRENTLY, THE UTILITY IS MAKING TESTS TO STUDY ALTERNATE SO2 COMPLIANCE STRATEGIES.

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SECTION 5

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	ARIZONA PUBLIC SERVICE
UNIT NAME	CHOLLA NO 1
UNIT LOCATION	JOSEPH CITY ARIZONA
UNIT RATING	115 MW
FUEL CHARACTERISTICS	COAL 0.40-1 PERCENT SULFUR
FGD VENDOR	RESEARCH COTTRELL
PROCESS	LIMESTONE
FGD OR REHEAT	REHEAT
START UP DATE	10/73

EFFICIENCY:

PARTICULATES	(ACTUAL)	99.7 PERCENT
	(DESIGN)	99.7 PERCENT
SO2	(ACTUAL)	90.0 PERCENT
	(DESIGN)	90.5 PERCENT

WATER MAKE UP	OPEN LOOP 1.04 GPM/MW
SLUDGE DISPOSAL	EXISTING FLY ASH POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

MONTH	RELIABILITY (%) MODULE A	MODULE B	COMMENTS
JAN. 78	47	91	THE FLOODED DISC SCRUBBER TANK HEADER FOR SLURRY LINE WAS REPAIRED AFTER BEING DAMAGED DURING THE OVERHAUL. THE BOILER WAS OPERATED ONLY 135 HRS. DURING JANUARY AS THE OVERHAUL HAD EXTENDED INTO THIS MONTH. THE A-SIDE AND B-SIDE SERVICE HOURS WERE 131 AND 123 HOURS RESPECTIVELY.
FEB. 78	99	00	SOME MINOR LEAK REPAIRS AFTER THE OVERHAUL/CLEANING TOOK PLACE DURING FEBRUARY. SERVICE HOURS WERE: BOILER = 692, A-SIDE = 636, B-SIDE = 564.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

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UTILITY NAME	COLUMBUS & SOUTHERN OHIO ELEC.
UNIT NAME	CONESVILLE NO 5
UNIT LOCATION	CONESVILLE OHIO
UNIT RATING	400 MW
FUEL CHARACTERISTICS	COAL 4.5 - 4.9 PERCENT SULFUR
FGD VENDOR	UNIVERSAL OIL PRODUCTS
PROCESS	LIME
USE OF BYPASS	YES
START UP DATE	1977

EFFICIENCY:

PARTICULATES (ACTUAL)

(DESIGN) 99.0 PERCENT

SO2 (ACTUAL)

(DESIGN) 89.5 PERCENT

WATER MAKE UP — OPEN LOOP

SLUDGE DISPOSAL — PUMPED TO A LANDFILL

UNIT COST — SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

PERIOD	OPERATION TIME (HR) MILLER	ABSOR	REGEN	COMMENTS
JAN. 78		0	0	
ALL INDEX VALUES = 0 PERCENT				
FEB. 78				THE UNIT WAS SHUTDOWN FOR OVERHAUL THROUGH FEBRUARY AND STARTED UP ON MARCH 16.
ALL INDEX VALUES = 0 PERCENT				
MAR. 78	379	72	60	IMPURITIES IN LIME HAVE CAUSED PLUGGING PROBLEMS. PH
AVAILABILITY (%) =	60	60		CONTROLS AND SO2 ANALYSERS HAVE GIVEN SOME OPERATIONAL
OPERABILITY (%) =	60	50		PROBLEMS.
RELIABILITY (%) =	19	18		
UTILIZATION (%) =	19	18		

SECTION 5

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	COLUMBUS & SOUTHERN OHIO ELEC.
UNIT NAME	CONESVILLE NO 6
UNIT LOCATION	CONESVILLE OHIO
UNIT RATING	400 MW
FUEL CHARACTERISTICS	COAL 4.5 - 4.9 PERCENT SULFUR
FGD VENDOR	UNIVERSAL OIL PRODUCTS
PROCESS	LIME
YEAR ON REINUFF	YES
START UP DATE	6/78

EFFICIENCY:

PARTICULATES	(ACTUAL)	99.6 PERCENT
	(DESIGN)	
SO2	(ACTUAL)	89.5 PERCENT
	(DESIGN)	

WATER MAKE UP

SLUDGE DISPOSAL	PUMPED TO LANDFILL
UNIT COST	$58,601 PER CAPITAL FOR UNITS 5 AND 6 (1975 DOLLARS)

OPERATING EXPERIENCE UPDATE:

REQ. 78
MAR. 78

THE UNIT IS CURRENTLY IN IT'S PRE-OPERATIONAL PHASE. FULL COMMERCIAL OPERATION IS EXPECTED AFTER INITIAL START-UP PROBLEMS HAVE BEEN CORRECTED.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME: DUQUESNE LIGHT

UNIT NAME: ELRAMA POWER STATION

UNIT LOCATION: ELRAMA PENNSYLVANIA

UNIT RATING: 510 MW

FUEL CHARACTERISTICS: COAL 1.8-2.2 PERCENT SULFUR

FGD VENDOR: CHEMICO

PROCESS: LIME

NEW OR RETROFIT: RETROFIT

START UP DATE: 10/75

EFFICIENCY:
PARTICULATES (ACTUAL) 99.0 PERCENT
(DESIGN) 99.0 PERCENT
SO2 (ACTUAL) 60.0 PERCENT
(DESIGN) 83.0 PERCENT - 2% S COAL

WATER MAKE UP: OPEN LOOP

SLUDGE DISPOSAL: HAULAWAY TO OFF SITE LANDFILL

UNIT COST: SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

PERIOD	OPERATING HOURS BOILER	SCRUBBER-ABSORBER VESSELS 101	201	301	401	501	
JAN. 78		700	673	38	181	26	DURING THE PERIOD A NEW NORMER RECYCLE PUMP INSTALLED IN NOVEMBER EXPERIENCED JACK SHAFT BEARING PROBLEMS RESULTING IN THE REMOVAL OF TRAIN 501 FROM SERVICE. BOILER NO. 4 WAS CONNECTED ADDING AN ADDITIONAL 176 MW LOAD TO THE SYSTEM. THE IUCS SLUDGE DISPOSAL FACILITY IS IN SERVICE PRODUCING GOOD PRODUCT. LOW LOAD AND THE COAL STRIKE HAVE HAMPERED GOOD SCRUBBER OPERATIONS. THERE IS SOME OUTAGE TIME SCHEDULED FOR MARCH.
FEB. 78		204	277	0	107	121	THE SYSTEM WAS SHUTDOWN ON FEB. 11 DUE TO A COAL SHORTAGE. THE FOLLOWING REPAIRS WERE DONE DURING THE OUTAGE WHICH CONTINUED THROUGH MARCH:
MAR. 78	0	0	0	0	0	0	* BOILER EXIT DAMPERS WERE LINED WITH 316 SS ON AREAS OF HIGH EROSION CAUSED BY FLYASH IMPINGEMENT. * EXPANSION JOINTS IN THE UPSTREAM DUCTWORK WERE SHIELDED BY METAL PLATES WHICH WERE WELDED AT ONE END. * EXPANSION JOINTS IN THE DOWNSTREAM DUCTWORK WERE COMPLETELY REPLACED. * THE DOWNSTREAM DUCTWORK WAS RELINED WITH CEILCOTE. * MODULE 401 INTERNALS WERE CLEANED AND SOME HOLES IN THE UPPER CONICAL REGION WERE REPAIRED. BOILER NOS. 1, 2 AND 4 ARE NOW COMPLETELY CONNECTED TO THE FGD SYSTEM. BOILER NO. 3 IS UNDERGOING AN EXTENSIVE OVERHAUL AND WILL BE CONNECTED TO THE SYSTEM IN LATE APRIL.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	DUQUESNE LIGHT
UNIT NAME	PHILLIPS POWER STATION
UNIT LOCATION	SOUTH HEIGHT PENNSYLVANIA
UNIT RATING	410 MW
FUEL CHARACTERISTICS	COAL 1.8-2.2 PERCENT SULFUR
FGD VENDOR	CHEMICO
PROCESS	LIME
NEW OR RETROFIT	RETROFIT
START UP DATE	7/73
EFFICIENCY:	
PARTICULATES (ACTUAL)	99 PERCENT
(DESIGN)	99.0
SO2 (ACTUAL)	83 PERCENT DESIGN - 2% S COAL
(DESIGN)	83.0
WATER MAKE UP	OPEN LOOP
SLUDGE DISPOSAL	HAULAWAY TO OFF SITE LANDFILL
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

	OPERATING HOURS									
	BOILER						SCRUBBER-ABSORBER			
MONTH	1	2	3	4	5	6	101	201	301	401
JAN. 78							627	574	0	484
FEB. 78							209	287	18	152

AN OUTAGE OCCURRED BETWEEN JAN. 6 AND JAN. 8 WHEN THE STACK DRAIN LEAKS WERE REPAIRED BY SANDBLASTING THE OUTER WALL AND REPLACING THE CARBON STEEL BANDS WITH STAINLESS STEEL BANDS. THE SYSTEM WAS SHUTDOWN ON FEB. 11 DUE TO THE COAL SHORTAGE. THE OUTAGE CONTINUED THROUGH MARCH AND THE SYSTEM IS SCHEDULED TO BE ON LINE BY APRIL 15. DURING THE OUTAGE THE FOLLOWING REPAIRS AND MODIFICATIONS WERE MADE:

- THE BOILER EXIT DAMPERS WERE LINED WITH 316SS ON AREAS OF HIGH EROSION CAUSED BY FLYASH IMPINGEMENT.
- EXPANSION JOINTS ON THE INLET DUCTWORK WERE SHIELDED BY METAL PLATES WHICH WERE WELDED AT ONE END.
- NUMEROUS HOLES IN THE WET GAS DUCT WORK WERE REPAIRED AND THE DUCTS WERE RELINED WITH CEILCOTE.
- THE THROAT DAMPERS WERE CLEANED ON ALL THE SCRUBBERS.
- INTERNAL MIST ELIMINATORS WERE CLEANED. THE EXTERNAL MIST ELIMINATORS, WHICH ARE BADLY DETERIORATED, MAY BE REPLACED.
- THE STACK BRICKLINING WAS INSPECTED AND SOME BRICKS WERE REPLACED AT THE TOP OF THE STACK.

CONSTRUCTION WORK ON ADDITIONAL EQUIPMENT SUCH AS THE THICKENER AND SILOS IS ALMOST COMPLETE. IT WAS NOTED THAT THE CEILCOTE LINER CORDLINE 505AR HAS HELD UP WELL OVER THREE YEARS ON THE CONICAL APEX OF MODULE 401.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	INDIANAPOLIS POWER & LIGHT CO.
UNIT NAME	PETERSBURG NO 3
UNIT LOCATION	PETERSBURG INDIANA
UNIT RATING	530 MW
FUEL CHARACTERISTICS	COAL 3.0-3.5 PERCENT SULFUR
FGD VENDOR	UNIVERSAL OIL PRODUCTS
PROCESS	LIMESTONE
NEW OR RETROFIT	NEW
START UP DATE	10/77
EFFICIENCY:	
PARTICULATES (ACTUAL)	
(DESIGN)	99.3 PERCENT
SO2 (ACTUAL)	
(DESIGN)	80.0 PERCENT
WATER MAKE UP	
SLUDGE DISPOSAL	IUCS SLUDGE STABILIZATION
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

DECEMBER-JANUARY 1978 - OPERATION OF ALL FOUR MODULES WAS INITIATED IN DECEMBER 1977. A SUCCESSFUL 24 HOUR RUN WAS COMPLETED ON DEC. 16 AND 17 WITH MODULES "B", "C" AND "D" IN OPERATION. "A" MODULE HAD AN INOPERATIVE RECYCLE TANK AGITATOR. REPAIR OF THE AGITATOR WAS COMPLETED ON DEC. 22 AND MODULE A WAS PLACED IN INITIAL OPERATION. A 30 DAY RUN SCHEDULED TO BEGIN JAN. 11 WAS POST-PONED UNTIL MID MARCH PENDING RESOLUTION OF PROBLEMS ASSOCIATED WITH THE FLY ASH REMOVAL SYSTEM. THE COLD WEATHER NECESSITATED THE ERECTION OF TEMPORARY ENCLOSURES AROUND SEGMENTS OF THE FGD SYSTEM UNTIL THE INSTALLATION OF HEAT TRACING COULD BE COMPLETED.

FEBRUARY-MARCH 1978 - THE MODULES DID NOT OPERATE DURING FEBRUARY AS REPAIRS WERE MADE TO LINES AND VALVES DAMAGED BY FREEZE-UPS DURING THE WINTER. DURING MARCH SOME SCHEDULED REPAIRS WERE MADE WHICH INCLUDED INSTRUMENTATION WORK, INSULATION INSTALLATION AND REPAIR OF A BROKEN PINION GEAR ON THE THICKENER. SYSTEM START UP IS STILL BEING DELAYED BY PROBLEMS WITH THE FLY ASH HANDLING SYSTEM AND IS NOW EXPECTED TO BE IN MID-APRIL.

SECTION 5
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	KANSAS CITY POWER & LIGHT
UNIT NAME	HAWTHORN NO. 5
UNIT LOCATION	KANSAS CITY MISSOURI
UNIT RATING	140 MW
FUEL CHARACTERISTICS	COAL .0.5-5.5 PERCENT SULFUR
FGD VENDOR	COMBUSTION ENGINEERING
PROCESS	LIME
NEW OR RETROFIT	RETROFIT
START UP DATE	11/72
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	
(DESIGN)	70.0 PERCENT
WATER MAKE UP	OPEN LOOP 7.0 GPM/MW
SLUDGE DISPOSAL	PLANT SITE DISPOSAL POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

MONTH	PERIOD HRS.	BOILER HRS.	FGD SYSTEM HRS.	FGD SYSTEM AVAILABILITY (%)
FEB. 78	672	167	16	25
MAR. 78	744	406	406	56

DURING FEBRUARY THE UNIT WAS DOWN FOUR TIMES WITH ECONOMIZER AND WATER WALL LEAKS (OUTAGE TIME APROX. 504 HRS). A TWO WEEK OUTAGE WAS SCHEDULED DURING MARCH FOR SEASONAL MAINTENANCE. WATER WALL LEAK REPAIR AS WELL AS ACID CLEANING OF THE BOILER CAUSED ADDITIONAL OUTAGE TIME DURING THE LAST WEEK IN MARCH.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	KANSAS CITY POWER & LIGHT
UNIT NAME	HAWTHORN NO. 4
UNIT LOCATION	KANSAS CITY MISSOURI
UNIT RATING	100 MW
FUEL CHARACTERISTICS	COAL 0.5-3.5 PERCENT SULFUR
FGD VENDOR	COMBUSTION ENGINEERING
PROCESS	LIME
NEW OR RETROFIT	RETROFIT
START UP DATE	8/72
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	
(DESIGN)	70.0 PERCENT
WATER MAKE UP	OPEN LOOP 7.0 GPM/MW
SLUDGE DISPOSAL	PLANT SITE DISPOSAL POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

MONTH	PERIOD HRS.	BOILER HRS.	FGD SYSTEM HRS.	FGD SYSTEM AVAILABILITY (%)
FEB. 78	672	198	198	30
MAR. 78	744	471	471	63

THE UNIT WAS DOWN THREE TIMES DURING FEBRUARY FOR NON-SCRUBBER RELATED PROBLEMS. TWO OTHER OUTAGES WERE THE RESULT OF A FUEL SAFETY TRIP PROBLEM AND GENERAL SCRUBBER MAINTENANCE. IN MARCH THERE WERE THREE ECONOMIZER LEAK OUTAGES (APPOX. 231 HRS) AND THE SCRUBBER REQUIRED AN ADDITIONAL 32 HRS OF OUTAGE TIME FOR MAINTENANCE.

SECTION 5
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	KANSAS CITY POWER & LIGHT
UNIT NAME	LA CYGNE NO 1
UNIT LOCATION	LA CYGNE KANSAS
UNIT RATING	820 MW
FUEL CHARACTERISTICS	COAL 5.0 PERCENT SULFUR
FGD VENDOR	BABCOCK & WILCOX
PROCESS	LIMESTONE
NEW OR RETROFIT	NEW
START UP DATE	2/73
EFFICIENCY:	
PARTICULATES (ACTUAL)	98.2 PERCENT
(DESIGN)	98.0 PERCENT
SO2 (ACTUAL)	80.1 PERCENT
(DESIGN)	76.0 PERCENT
WATER MAKE UP	OPEN LOOP 1.4 GPM/MW
SLUDGE DISPOSAL	PLANT SITE DISPOSAL POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

		PERCENT AVAILABILITY-BY MODULE								
MONTH	BOILER HOURS	A	B	C	D	E	F	G	H	AVERAGE
FEB. 78	578	92	93	95	94	91	97	96	93	94
MAR. 78	741	95	95	90	95	94	95	89	93	93

FGD OPERATIONS AT LA CYGNE WERE ADEQUATE THROUGH THE REPORT PERIOD WITH NO MAJOR PROBLEMS ENCOUNTERED.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME		KANSAS POWER & LIGHT
UNIT NAME		LAWRENCE NO 4
UNIT LOCATION		LAWRENCE KANSAS
UNIT RATING		125 MW
FUEL CHARACTERISTICS		COAL 0.5 PERCENT SULFUR
FGD VENDOR		COMBUSTION ENGINEERING
PROCESS		LIMESTONE
NEW OR RETROFIT		RETROFIT
START UP DATE		12/68
EFFICIENCY:		
PARTICULATES	(ACTUAL)	99.0 PERCENT
	(DESIGN)	99.0 PERCENT
SO2	(ACTUAL)	65.0 PERCENT
	(DESIGN)	75.0 PERCENT
WATER MAKE UP		OPEN LOAD
SLUDGE DISPOSAL		PLANT SITE DISPOSAL POND
UNIT COST		

OPERATING EXPERIENCE UPDATE:

FEB. 78 THE FGD SYSTEM RAN SMOOTHLY DURING THE REPORT PERIOD WITH NO MAJOR PROBLEMS. THE
MAR. 78 THICKENER UNDERFLOW LINE IS STILL FROZEN AND TWO 3 INCH DIAMETER FIRE HOSES ARE BEING USED TO PUMP THE UNDERFLOW SOLIDS TO THE POND.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME: KANSAS POWER & LIGHT

UNIT NAME: LAWRENCE NO 5

UNIT LOCATION: LAWRENCE KANSAS

UNIT RATING: 400 MW

FUEL CHARACTERISTICS: COAL 0.5 PERCENT SULFUR

FGD VENDOR: COMBUSTION ENGINEERING

PROCESS: LIMESTONE

NEW OR RETROFIT: NEW

START UP DATE: 11/71

EFFICIENCY:

PARTICULATES	(ACTUAL)	99.0 PERCENT
	(DESIGN)	99.0 PERCENT
SO2	(ACTUAL)	65.0 PERCENT
	(DESIGN)	65.0 PERCENT

WATER MAKE UP: OPEN LOOP

SLUDGE DISPOSAL: PLANT SITE DISPOSAL POND

UNIT COST

OPERATING EXPERIENCE UPDATE:

MONTHS	OPERATING HOURS BOILER	FGD MODULES
FEB. 78		
MAR. 78		

THE ORIGINAL FGD SYSTEM WAS PULLED OFF LINE ON MARCH 20 SO THAT THE NEW SCRUBBER-ABSORBER SYSTEM COULD BE TIED IN. OPERATION OF THE NEW SYSTEM SHOULD BEGIN BY THE FIRST OF MAY.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME: KENTUCKY UTILITIES

UNIT NAME: GREEN RIVER NOS. 1 2 AND 3

UNIT LOCATION: CENTRAL CITY KENTUCKY

UNIT RATING: 64 MW

FUEL CHARACTERISTICS: COAL 3.8 PERCENT SULFUR

FGD VENDOR: AMERICAN AIR FILTER

PROCESS: LIME

NEW OR RETROFIT: RETROFIT

START UP DATE: 9/75

EFFICIENCY:

PARTICULATES (ACTUAL)

(DESIGN) 99.7 PERCENT

SO2 (ACTUAL)

(DESIGN) 80.0 PERCENT GUARANTEE

WATER MAKE UP: OPEN LOOP 1.20 GPM/MW

SLUDGE DISPOSAL: PLANT SITE DISPOSAL POND

UNIT COST: SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

PERIOD	TOTAL PERIOD (HR)	BOILER OPERATION (HR)	MODULE AVAILABILITY (HR)	MODULE CALLED TO OPERATE (HR)	HR. MODULE OPERATED
JAN.78*	744	537	722	537	170

AVAILABILITY = 97%
RELIABILITY = 32%
OPERABILITY = 32%
UTILIZATION = 23%

*DURING THE MONTHS OF DECEMBER AND JANUARY NUMEROUS FREEZE-UPS OCCURED. AS ONE COMPONENT WAS THAWED ANOTHER WOULD FREEZE. THE ABSORBER WAS AVAILABLE FOR FGD OPERATIONS BUT COULD NOT BE UTILIZED BECAUSE THE SLURRY LINE TO THE POND FROZE. THE UNIT WENT DOWN AFTER ABOUT 170 HOURS OF OPERATION IN JANUARY. BECAUSE OF EMERGENCY CONDITIONS THE UTILITY CHOSE TO CONCENTRATE THEIR MAINTENANCE CREWS ON POWER GENERATION RATHER THAN ON FGD OPERATIONS. UNDER NORMAL CONDITIONS THE RELATIVELY MINOR FGD SYSTEM PROBLEMS WOULD HAVE BEEN SOLVED MORE QUICKLY. IN LIGHT OF THIS THE SYSTEM HAS BEEN CONSIDERED AVAILABLE THROUGHOUT MOST OF THE PERIOD CONCERNED.

FEB. 78*	672	672	0	0	0

AVAILABILITY = 100%
RELIABILITY =
OPERABILITY =
UTILIZATION = 0%

DURING THE FREEZE UP NUMEROUS GASKETS WERE TORN THROUGHOUT THE SYSTEM. THE SYSTEM WAS SHUT DOWN COMPLETELY FOR REPAIR WORK.

MAR. 78*	744	669	0	0	0

AVAILABILITY = 100%
RELIABILITY =
OPERABILITY =
UTILIZATION = 0%

REPAIR WORK WILL CONTINUE UNTIL LATE APRIL 78 WHEN THE SCRUBBER-ABSORBER SYSTEM IS EXPECTED TO COME BACK ON LINE.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	LOUISVILLE GAS & ELECTRIC
UNIT NAME	CANE RUN NO 4
UNIT LOCATION	LOUISVILLE KENTUCKY
UNIT RATING	178 MW
FUEL CHARACTERISTICS	COAL 3.5 - 4.0 PERCENT SULFUR
FGD VENDOR	AMERICAN AIR FILTER
PROCESS	LIME
NEW OR RETROFIT	RETROFIT
START UP DATE	6/76
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	85.0 PERCENT
(DESIGN)	85.0 PERCENT
WATER MAKE UP	OPEN LOOP
SLUDGE DISPOSAL	PLANT-SITE DISPOSAL POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

PERIOD	HOURS	BOILER (HR)	FGD SYSTEM (HR)	PERFORMANCE FACTORS (%) OPERABILITY	UTILIZATION
FEB. 78	744	0	0	0	0
MAR. 78	744	249	249	34	34

THE UNIT WAS DOWN THE ENTIRE MONTH OF FEBRUARY DUE TO THE COAL SHORTAGE AND AN UNAVAILABILITY OF LIMESTONE RESULTING FROM THE SEVERE WINTER WEATHER. IT CAME BACK ON LINE MARCH 21 AFTER WHICH TIME THE FGD SYSTEM WAS ON LINE DURING 95% OF THE BOILER HOURS THROUGH THE END OF MAR.

SECTION 5
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	LOUISVILLE GAS & ELECTRIC
UNIT NAME	CANE RUN NO 5
UNIT LOCATION	LOUISVILLE KENTUCKY
UNIT RATING	163 MW
FUEL CHARACTERISTICS	COAL 3.5 - 4.0 PERCENT SULFUR
FGD VENDOR	COMBUSTION ENGINEERING
PROCESS	LIME
NEW OR RETROFIT	RETROFIT
START UP DATE	12/77
EFFICIENCY:	
PARTICULATES (ACTUAL)	
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	
(DESIGN)	85.0 PERCENT
WATER MAKE UP	CLOSED LOOP
SLUDGE DISPOSAL	PLANT-SITE DISPOSAL POND
UNIT COST	$65/KW (ESTIMATE)

OPERATING EXPERIENCE UPDATE:

DECEMBER-JANUARY 1978 - OPERATION OF THE SCRUBBER-ABSORBER SYSTEM AT CANE RUN NO. 5 BEGAN ON DEC. 29. INITIAL OPERATION LASTED ONLY A COUPLE OF DAYS DUE TO THE FACT THAT THE PLANT WAS SHUT DOWN SHORTLY AFTER START-UP AS A RESULT OF THE COAL STRIKE. DURING OPERATION SOME OF THE CONTROLS WERE NOT WORKING PROPERLY AND MODIFICATIONS WERE NECESSARY.

FEBRUARY-MARCH 1978 - THE PLANT REMAINED OFF LINE THROUGHOUT FEBRUARY AND THEN RE-STARTED ON MARCH 24. THE BOILER OPERATED APPROXIMATELY 182 HOURS THROUGH THE END OF MARCH WITH THE SCRUBBER-ABSORBER SYSTEM OPERATING APPROXIMATELY 91 HOURS. VARIOUS INITIAL START-UP PROBLEMS WERE STILL BEING ENCOUNTERED CAUSING FGD SYSTEM OUTAGES.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	LOUISVILLE GAS & ELECTRIC
UNIT NAME	PADDYS RUN NO 6
UNIT LOCATION	LOUISVILLE KENTUCKY
UNIT RATING	65 MW
FUEL CHARACTERISTICS	COAL 3.5 - 4.0 PERCENT SULFUR
FGD VENDOR	COMBUSTION ENGINEERING
PROCESS	LIME
NEW OR RETROFIT	RETROFIT
START UP DATE	4/73
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	85.0 PERCENT
(DESIGN)	80.0 PERCENT
WATER MAKE UP	OPEN LOOP 0.7 GPM/MW
SLUDGE DISPOSAL	HAULAWAY TO BURNOW PIT
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

SEP. 77 THROUGH MAR. 78 NOT OPERATIONAL

PADDY'S RUN NO. 6 DID NOT OPERATE THROUGH THIS PERIOD DUE TO A LACK OF POWER REQUIREMENT.

*NOTE: THIS UNIT WILL BE RETIRED WHEN THE MILL CREEK NO. 3 UNIT BECOMES OPERATIONAL, WHICH IS SCHEDULED FOR JULY, 1978.

SECTION 5

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	MINNKOTA POWER COOPERATIVE
UNIT NAME	MILTON R. YOUNG NO. 2
UNIT LOCATION	CENTER NORTH DAKOTA
UNIT RATING	450 MW
FUEL CHARACTERISTICS	LIGNITE 0.7 PERCENT SULFUR
FGD VENDOR	ADL/COMBUSTION EQUIP ASSOCIATE
PROCESS	LIME/ALKALINE FLYASH
NEW OR RETROFIT	NEW
START UP DATE	9/77
EFFICIENCY:	
PARTICULATES (ACTUAL)	
(DESIGN)	99.6 PERCENT
SO2 (ACTUAL)	
(DESIGN)	75.0 PERCENT
WATER MAKE UP	CLOSED LOOP
SLUDGE DISPOSAL	PLANT SITE/MINE FILL
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

FEBRUARY-MARCH 1978 - BOTH THE BOILERS AND FGD SYSTEM CAME BACK ON LINE FEB. 21 AFTER COMPLETION OF THE TURBINE REPAIRS. ONE SCRUBBER-ABSORBER FORCED DRAFT FAN HAD AN OIL LEAK AND A SHAFT ALIGNMENT PROBLEM. IT WAS TAKEN OFF THE LINE AND SHIPPED TO BUFFALO FORGE CO.'S PLANT FOR REPAIRS. THE AFFECTED MODULE WAS DOWN FROM FEB. 23 THROUGH APRIL 10, WHEN THE REPAIRED UNIT WAS RE-INSTALLED. THE VACUUM FILTER ON THE SECOND SCRUBBER-ABSORBER WAS MALFUNCTIONING, ALLOWING LARGER SIZE PARTICLES TO ESCAPE THE FILTER. THIS CAUSED THE RUBBER LINING DOWNSTREAM TO PEEL WHICH, IN TURN, CREATED A PLUGGING PROBLEM. B.I.-M. CONSULTANT ENGINEERS ARE PRESENTLY STUDYING THE PROBLEM AND HOPE TO INCORPORATE MODIFICATIONS TO IMPROVE THE PERFORMANCE OF THE FILTERS. THE COMPLIANCE TEST WAS AGAIN BEEN RESCHEDULED WITH THE EPA FOR THE END OF MAY.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	MONTANA POWER CO.
UNIT NAME	COLSTRIP NO 1
UNIT LOCATION	COLSTRIP MONTANA
UNIT RATING	360 MW
FUEL CHARACTERISTICS	COAL 0.8 PERCENT SULFUR
FGD VENDOR	ADL/COMBUSTION EQUIP ASSOCIATE
PROCESS	LIME/ALKALINE FLYASH
NEW OR RETROFIT	NEW
START UP DATE	11/75
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.9 PERCENT
(DESIGN)	99.9 PERCENT
SO2 (ACTUAL)	75.0 PERCENT
(DESIGN)	60.0 PERCENT
WATER MAKE UP	CLOSED LOOP
SLUDGE DISPOSAL	CLAY-LINED DIKED POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

FEB. 78
MAR. 78
NO INFORMATION WAS REPORTED BY THE UTILITY FOR THIS PERIOD.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	MONTANA POWER CO.
UNIT NAME	COLSTRIP NO 2
UNIT LOCATION	COLSTRIP MONTANA
UNIT RATING	360 MW
FUEL CHARACTERISTICS	COAL 0.8 PERCENT SULFUR
FGD VENDOR	ADL/COMBUSTION EQUIP ASSOCIATE
PROCESS	LIME/ALKALINE FLYASH
NEW OR RETROFIT	NEW
START UP DATE	7/76
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.5 PERCENT
(DESIGN)	99.5 PERCENT
SO2 (ACTUAL)	75.0 PERCENT
(DESIGN)	60.0 PERCENT
WATER MAKE UP	CLOSED LOOP
SLUDGE DISPOSAL	
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

JAN. 78
FEB. 78
MAR. 78
NO INFORMATION WAS REPORTED BY THE UTILITY FOR THIS PERIOD.

SECTION 5
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	NEVADA POWER
UNIT NAME	REID GARDNER NO 1
UNIT LOCATION	MOAPA NEVADA
UNIT RATING	125 MW
FUEL CHARACTERISTICS	COAL 0.5 - 1.0 PERCENT SULFUR
FGD VENDOR	ADL/COMBUSTION EQUIP ASSOCIATE
PROCESS	SODIUM CARBONATE
NEW OR RETROFIT	RETROFIT
START UP DATE	4/74
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	85.0 PERCENT
(DESIGN)	85.0 PERCENT
WATER MAKE UP	OPEN LOOP 0.40 GPM/MW
SLUDGE DISPOSAL	SOLAR EVAPORATION POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

PERIOD	TOTAL (HR.)	BOILER OPERATION (HR.)	MODULE AVAILABLE (HR.)	HR. CALLED UPON TO OPERATE	OPERATION (HR.)
FEB. 78	672	389	654	309	292

AVAILABILITY = 97%
RELIABILITY = 94%
OPERABILITY = 75%
UTILIZATION = 43%

THE SCRUBBER-ABSORBER SYSTEM WAS OFF-LINE FOR APPROXIMATELY 18 HOURS DURING FEBRUARY DUE TO PLUGGED SENSING LINES AND A DUCT HI-LO PRESSURE TRIP. THE BOILER WENT OUT OF SERVICE ON ON FEBRUARY 17 FOR A THREE WEEK OUTAGE.

MAR. 78	744	355	207	355	207

AVAILABILITY = 28%
RELIABILITY = 58%
OPERABILITY = 58%
UTILIZATION = 28%

THE BOILER CAME BACK ON LINE MARCH 16 BUT PROBLEMS WITH THE GUILLOTINE SWITCHES DELAYED START-UP OF THE FGD SYSTEM UNTIL MARCH 22. FGD DOWNTIME WAS APPROXIMATELY 537 HOURS. A PROBLEM WAS ALSO ENCOUNTERED WITH THE REHEAT STEAM REGULATOR DURING MARCH.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	NEVADA POWER
UNIT NAME	REID GARDNER NO 2
UNIT LOCATION	MOAPA NEVADA
UNIT RATING	125 MW
FUEL CHARACTERISTICS	COAL 0.5 - 1.0 PERCENT SULFUR
FGD VENDOR	ADL/COMBUSTION EQUIP ASSOCIATE
PROCESS	SODIUM CARBONATE
NEW OR RETROFIT	RETROFIT
START UP DATE	4/74
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	85.0 PERCENT
(DESIGN)	85.0 PERCENT
WATER MAKE UP	OPEN LOOP 0.40 GPM/MW
SLUDGE DISPOSAL	SOLAR EVAPORATION POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

PERIOD	TOTAL (HR.)	BOILER OPERATION (HR.)	MODULE AVAILABLE (HR.)	HR. CALLED UPON T OPERATE	OPERATION (HR.)
FEB. 78	672	636	625	632	585

AVAILABILITY = 93%
RELIABILITY = 92%
OPERABILITY = 92%
UTILIZATION = 87%

FGD DOWNTIME DURING FEBRUARY WAS APPROXIMATELY 48 HOURS DUE TO A PLUGGED SENSING LINE AND A DUCT HI-LO PRESSURE TRIP. THE BOILER WAS OUT OF SERVICE 34 HOURS.

MAR. 78	744	672	726	614	595

AVAILABILITY = 98%
RELIABILITY = 97%
OPERABILITY = 89%
UTILIZATION = 80%

THERE WAS ONLY ONE FORCED FGD OUTAGE DURING MARCH WHICH LASTED APPROXIMATELY 18 HOURS. A SCHEDULED BOILER OUTAGE AT THE BEGINNING OF THE MONTH TO REMOVE ASH BUILDUP WAS CANCELLED.

SECTION 5
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME: NEVADA POWER

UNIT NAME: REID GARDNER NO 3

UNIT LOCATION: MOAPA NEVADA

UNIT RATING: 125 MW

FUEL CHARACTERISTICS: COAL 0.5 - 1.0 PERCENT SULFUR

FGD VENDOR: ADL/COMBUSTION EQUIP ASSOCIATE

PROCESS: SODIUM CARBONATE

NEW OR RETROFIT: NEW

START UP DATE: 7/76

EFFICIENCY:
PARTICULATES (ACTUAL) 99.0 PERCENT
(DESIGN) 99.0 PERCENT
SO2 (ACTUAL) 85.0 PERCENT
(DESIGN) 85.0 PERCENT

WATER MAKE UP: OPEN LOOP 0.40 GPM/MW

SLUDGE DISPOSAL: SOLAR EVAPORATION POND

UNIT COST

OPERATING EXPERIENCE UPDATE:

PERIOD	TOTAL (HR.)	BOILER OPERATION (HR.)	MODULE AVAILABLE (HR.)	HR. CALLED UPON TO OPERATE	OPERATION (HR.)
FEB. 78	672	619	642	618	588

AVAILABILITY = 96%
RELIABILITY = 95%
OPERABILITY = 95%
UTILIZATION = 88%
DURING FEBRUARY FAULTY WIRING CAUSED A HIGH VENTURI TEMPERATURE RESULTING IN AN INITIAL 16 HOUR FGD SYSTEM OUTAGE. THERE WAS A SECOND OUTAGE OF 13 HOURS TO CHECK THE VENTURI TEMPERATURE INDICATOR. A THIRD OUTAGE WAS CAUSED BY PLUGGING OF THE MIX TANK WHICH MADE IT IMPOSSIBLE TO MIX CHEMICALS.

MAR. 78	744	741	724	738	718

AVAILABILITY = 97%
RELIABILITY = 97%
OPERABILITY = 97%
UTILIZATION = 96%
THE MIX TANK PROBLEM CONTINUED INTO MARCH CAUSING THE ONLY FGD DOWNTIME FOR THE MONTH (APROX. 20 HOURS). A FURNACE HI-LO PRESSURE TRIP CAUSED A BOILER OUTAGE OF 6 HOURS.

SECTION 5
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	NORTHERN INDIANA PUB SERVICE
UNIT NAME	DEAN H. MITCHELL NO. 11
UNIT LOCATION	GARY INDIANA
UNIT RATING	115 MW
FUEL CHARACTERISTICS	COAL 3.2-3.5 PERCENT SULFUR
FGD VENDOR	DAVY POWERGAS/ALLIED CHEMICAL
PROCESS	WELLMAN LORD/ALLIED CHEMICAL
NEW OR RETROFIT	RETROFIT
START UP DATE	11/76
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.5 PERCENT
(DESIGN)	99.5 PERCENT
SO2 (ACTUAL)	91.0 PERCENT
(DESIGN)	90.0 PERCENT
WATER MAKE UP	CLOSED LOOP
SLUDGE DISPOSAL	ELEMENTAL SULFUR PRODUCT
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

FEB. 78
MAR. 78
NO INFORMATION WAS REPORTED BY THE UTILITY FOR PUBLICATION DURING THIS REPORT PERIOD.

SECTION 5
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	NORTHERN STATES POWER CO.
UNIT NAME	SHERBURNE COUNTY STATION NO.1
UNIT LOCATION	BECKER MINNESOTA
UNIT RATING	710 MW
FUEL CHARACTERISTICS	COAL 0.8 PERCENT SULFUR
FGD VENDOR	COMBUSTION ENGINEERING
PROCESS	LIMESTONE
NEW OR RETROFIT	NEW
START UP DATE	5/76
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	55.0 PERCENT
(DESIGN)	50.0 PERCENT
WATER MAKE UP	OPEN LOOP 1.13 GPM/MW
SLUDGE DISPOSAL	CLAY-LINED DISPOSAL POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

TOTAL SYSTEM AVAILABILITY = 92 PERCENT
MEGAWATT-HOURS GENERATED = 423,220
STRAINER MODIFICATIONS CONTINUED THROUGH MARCH AFFECTING THE AVAILABILITIES OF MODULES 101, 103, 107 AND 110.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	NORTHERN STATES POWER CO.
UNIT NAME	SHERBURNE COUNTY STATION NO.2
UNIT LOCATION	BECKER MINNESOTA
UNIT RATING	710 MW
FUEL CHARACTERISTICS	COAL, 0.8 PERCENT SULFUR
FGD VENDOR	COMBUSTION ENGINEERING
PROCESS	LIMESTONE
NEW OR RETROFIT	NEW
START UP DATE	4/77
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.0 PERCENT
(DESIGN)	99.0 PERCENT
SO2 (ACTUAL)	55.0 PERCENT
(DESIGN)	50.0 PERCENT
WATER MAKE UP	OPEN LOOP 1.13 GPM/MW
SLUDGE DISPOSAL	CLAY-LINED DISPOSAL POND
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

BOILER OPERATION TIME AND MODULE OPERABILITY (%)

PERIOD	BOILER HR.	101	102	103	104	105	106	107	108	109	110	111	112
FEB. 78	620	83	85	55	91	89	76	71	89	85	81	97	60

TOTAL SYSTEM AVAILABILITY = 92 PERCENT
MEGAWATT-HOURS GENERATED = 367,080
MODULES 203 AND 212 HAVE LOW AVAILABILITY DUE TO STRAINER MODIFICATIONS.

MAR. 78	744	82	92	90	83	78	85	91	62	83	78	88	89

TOTAL SYSTEM AVAILABILITY = 97 PERCENT
MEGAWATT-HOURS GENERATED = 483,750
IN SPITE OF STRAINER MODIFICATIONS ON MODULES 208 AND 210, THE SYSTEM GENERATED MAXIMUM MEGAWATT-HOURS AND TIED THE HIGHEST RECORDED AVAILABILITY OF 97 PERCENT.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	PENNSYLVANIA POWER CO.
UNIT NAME	BRUCE MANSFIELD NO. 1
UNIT LOCATION	SHIPPINGPORT PENNSYLVANIA
UNIT RATING	825 MW
FUEL CHARACTERISTICS	COAL 4.7 PERCENT SULFUR
FGD VENDOR	CHEMICO
PROCESS	LIME
NEW OR RETROFIT	NEW
START UP DATE	4/76
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.8 PERCENT
(DESIGN)	99.8 PERCENT
SO2 (ACTUAL)	96.0 PERCENT
(DESIGN)	92.0 PERCENT
WATER MAKE UP	OPEN LOOP
SLUDGE DISPOSAL	RESERVOIR LANDFILL
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

MONTH	BOILER	OPERATING HOURS FGD MODULES A	B	C	D	E	F
NOV. 77	720	682	713	657	0	0	0
FGD AVAILABILITY FACTOR %		95	99	91	0	0	0
FGD OPERABILITY FACTOR %		95	99	91	0	0	0
FGD UTILIZATION FACTOR %		95	99	91	0	0	0

TOTAL FGD LOST GENERATION FACTOR = 52.5

REMOVAL OF THE OLD COATING AND PRIMING OF THE FLUE LINING IN FLUE 1B IS PROCEEDING SLOWER THAN ANTICIPATED. IT IS EXPECTED THAT TOTAL WORK ON THE FLUE WILL NOT BE COMPLETED UNTIL FEBRUARY OR MARCH 1978.

DEC. 77	624	677	592	675	0	0	0
FGD AVAILABILITY FACTOR %		100	93	99	0	0	0
FGD OPERABILITY FACTOR %		100	94	100	0	0	0
FGD UTILIZATION FACTOR %		91	79	91	0	0	0

TOTAL FGD LOST GENERATION FACTOR = 61 %

SANDBLASTING OF UNIT 1-B FLUE IS NEARING COMPLETION. THE FLUE WILL BE RELINED WITH P.P.P. CRL-2000.

JAN. 78	331						
FGD AVAILABILITY FACTOR %		100	0	100	0	0	0
FGD OPERABILITY FACTOR %		100	0	100	0	0	0
FGD UTILIZATION FACTOR		58	0	58	0	0	0

TOTAL FGD LOST GENERATION FACTOR = 60%

THERE WERE PROBLEMS WITH 1B FAN WHICH NECCESITATED EXTENSIVE REPAIRS. LINING ABRASION AND DISMANTLEMENT IN FAN CAUSED CORROSION OF UNDERLYING SUPPORT METAL. THE UNIT TRIPPED SEVERAL TIMES DUE TO DIFFICULTIES IN BURNING WET STOCKPILE COAL.

FEB. 78	514	534	410	551	0	0	0
FGD AVAILABILITY FACTOR %		79	61	82	0	0	0
FGD OPERABILITY FACTOR %		100	80	100	0	0	0
FGD UTILIZATION FACTOR %		79	61	82	0	0	0

TOTAL FGD LOST GENERATION FACTOR = 54%

EXTENSIVE REPAIRS TO 1B I.D. FAN AND THE EMERGENCY NEED FOR LOAD FROM THE PLANT DURING COAL STRIKE TEMPORARILY OVERLOADED 1A AND 1C TRAINS. THE MIST ELIMINATOR WILL BE REPLACED ON 1C TRAIN AS A RESULT OF THIS. 1B FLUE RELINING CONTINUES.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME: PENNSYLVANIA POWER CO.

UNIT NAME: BRUCE MANSFIELD NO. 2

UNIT LOCATION: SHIPPINGPORT PENNSYLVANIA

UNIT RATING: 825 MW

FUEL CHARACTERISTICS: COAL 4.7 PERCENT SULFUR

FGD VENDOR: CHEMICO

PROCESS: LIME

NEW OR RETROFIT: NEW

START UP DATE: 7/77

EFFICIENCY:
PARTICULATES (ACTUAL) 99.8 PERCENT
(DESIGN) 99.8 PERCENT
SO2 (ACTUAL) 96.0 PERCENT
(DESIGN) 92.0 PERCENT

WATER MAKE UP: OPEN LOOP

SLUDGE DISPOSAL: RESERVOIR LANDFILL

UNIT COST: SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

MONTH	BOILER	OPERATING HOURS FGD MODULES A	B	C	D	E	F
NOV. 77	581	598	584	533	331	304	246
FGD AVAILABILITY FACTOR %	100	96	68	47	55	47	
FGD OPERABILITY FACTOR %	100	100	92	57	52	42	
FGD UTILIZATION FACTOR %	83	81	74	46	42	34	

TOTAL FGD LOST GENERATION FACTOR = 27%
PROBLEMS ASSOCIATED WITH THE STATION POWER TRANSFORMERS CAUSED LIMITATION IN LOAD ON UNIT 2. THREE OF THE SIX STATION TRANSFORMERS FOR UNIT 2 WERE DESTROYED.

DEC. 77	607	469	638	618	644	513	565
FGD AVAILABILITY FACTOR %	74	99	98	100	89	99	
FGD OPERABILITY FACTOR %	77	100	100	100	85	93	
FGD UTILIZATION FACTOR %	63	86	83	86	69	76	

TOTAL FGD LOST GENERATION FACTOR = 7.4%
COLD WEATHER CREATED SOME FREEZING PROBLEMS WITH PROCESS PIPING.

JAN. 78	391						
FGD AVAILABILITY FACTOR %	95	100	96	94	99	99	
FGD OPERABILITY FACTOR %	58	100	56	100	100	96	
FGD UTILIZATION FACTOR %	31	76	29	70	64	50	

TOTAL FGD LOST GENERATION FACTOR = 4.3%
UNIT TRIPPED SEVERAL TIMES DUE TO DIFFICULTIES IN BURNING WET STOCKPILE COAL. BOILER CONTROL VALVE PROBLEMS ("A" VALVE) COMPOUNDED START-UP ATTEMPT DIFFICULTIES. WHEN THE UNIT WAS ON LINE DURING THIS MONTH, THE WET COAL ALSO PREVENTED FULL LOAD OPERATION OF COAL MILLS.

FEB. 78	672	321	460	594	480	664	525
FGD AVAILABILITY FACTOR %	59	87	69	97	99	78	
FGD OPERABILITY FACTOR %	46	66	88	71	99	78	
FGD UTILIZATION FACTOR %	48	66	88	71	99	78	

TOTAL FGD LOST GENERATION FACTOR = 18.6 %
MANY PROBLEMS OCCURRED WITH I.D. FAN COOLERS DUE TO INCLEMENT WEATHER.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	PHILADELPHIA ELECTRIC CO.
UNIT NAME	EDDYSTONE NO. 1A
UNIT LOCATION	EDDYSTONE PENNSYLVANIA
UNIT RATING	120 MW
FUEL CHARACTERISTICS	COAL 2.5 PERCENT SULFUR
FGD VENDOR	UNITED ENGINEERS / PECO
PROCESS	MAGNESIUM OXIDE
NEW OR RETROFIT	RETROFIT
START UP DATE	9/75
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.9 PERCENT
(DESIGN)	99.9 PERCENT
SO2 (ACTUAL)	95.0 PERCENT
(DESIGN)	90.0 PERCENT
WATER MAKE UP	OPEN LOOP 1.1 GPM/MW
SLUDGE DISPOSAL	ACID PLANT REGENERATION
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

FEB. 78 THE TURBINE OVERHAUL CONTINUED DURING THE REPORT PERIOD. DURING THE SHUTDOWN PERIOD IT
MAR. 78 WAS FOUND THAT SOME HIGH PRESSURE STEAM TUBES WERE CRACKED, SO UNIT MAINTENANCE HAS TAKEN LONGER THAN EXPECTED. SOME MINOR FGD SYSTEM MODIFICATIONS HAVE BEEN INCORPORATED IN THE COURSE OF THE SHUTDOWN PERIOD. START UP IS EXPECTED IN MID-APRIL 78.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	PUBLIC SERVICE CO OF NEW MEX.
UNIT NAME	SAN JUAN NO. 1
UNIT LOCATION	WATERFLOW NEW MEXICO
UNIT RATING	375 MW
FUEL CHARACTERISTICS	COAL , 0.8 PERCENT SULFUR
FGD VENDOR	DAVY POWERGAS/ALLIED CHEMICAL
PROCESS	WELLMAN LORD/ALLIED CHEMICAL
NEW OR RETROFIT	NEW
START UP DATE	4/78
EFFICIENCY:	
PARTICULATES (ACTUAL)	
(DESIGN)	99.5 PERCENT
SO2 (ACTUAL)	
(DESIGN)	85.0 PERCENT
WATER MAKE UP	
SLUDGE DISPOSAL	
UNIT COST	$126/KW CAPITAL+5.0 MILLS/KWH OPERATING (ESTIMATES)

OPERATING EXPERIENCE UPDATE:

FEBRUARY-MARCH 1978 - INITIAL SO2 ABSORPTION AT SAN JUAN NO. 1 BEGAN ON APRIL 8, 1978. FULL COMMERCIAL OPERATION IS EXPECTED BY LATE JUNE. THE FGD SYSTEM IS CURRENTLY IN SERVICE WITH TWO OF THE UNIT'S FOUR ABSORBER CELLS OPERATING CONTINUOUSLY. A THIRD CELL IS TO BE BROUGHT ON LINE LATER. THREE CELLS WILL BE REQUIRED FOR FULL LOAD WITH A FOURTH INCLUDED FOR SPARE FGD CAPACITY. THE CURRENT MODE IS TO KEEP 2 CELLS IN SERVICE AT ALL TIMES AND 2 OUT OF SERVICE. 2/3'S OF THE FLUE GAS IS BEING TREATED WHILE 1/3 IS BEING BYPASSED. THE UNIT IS IN COMPLIANCE AT PRESENT WITH RESPECT TO SO2 WITH ONLY 2 CELLS RUNNING BECAUSE THE BISULFITE CONCENTRATION HAS NOT YET BUILT UP IN THE ABSORBENT LIQUOR. WHEN THE SYSTEM REACHES EQUILIBRIUM WITH RESPECT TO BISULFITE (18% BISULFITE) THE UNIT WILL BE READY TO BEGIN REGENERATING OPERATIONS. REGENERATION IS EXPECTED TO BEGIN BY APRIL 27. COMPLIANCE TESTING MAY TAKE PLACE AS EARLY AS THE FIRST WEEK OF MAY.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	SOUTH CAROLINA PUBLIC SERVICE
UNIT NAME	WINYAH NO. 2
UNIT LOCATION	GEORGETOWN SOUTH CAROLINA
UNIT RATING	280 MW
FUEL CHARACTERISTICS	COAL 1.0 PERCENT SULFUR
FGD VENDOR	BABCOCK & WILCOX
PROCESS	LIMESTONE
NEW OR RETROFIT	NEW
START UP DATE	7/77
EFFICIENCY:	
PARTICULATES (ACTUAL)	
(DESIGN)	99.6 PERCENT
SO2 (ACTUAL)	
(DESIGN)	69.0 PERCENT
WATER MAKE UP	OPEN LOOP
SLUDGE DISPOSAL	
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

FEB. 78 DURING THE FEB-MAR PERIOD THE FGD SYSTEM WAS BYPASSED ONCE FOR SEVERAL DAYS TO ALLOW
MAR. 78 SYSTEM CLEANING. THIS WAS IN PREPARATION FOR TESTS THAT BABCOCK AND WILCOX WILL SOON BE PERFORMING, AND FOR WHICH THEY HAVE SET UP TEMPORARY ON-SITE LABORATORY FACILITIES. OTHERWISE, THE SYSTEM RAN WELL DURING THE PERIOD WITH ONLY A FEW MINOR PLUGGING AND SPILLAGE PROBLEMS IN VARIOUS SLURRY LINES.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	SPRINGFIELD CITY UTILITIES
UNIT NAME	SOUTHEAST NO. 1
UNIT LOCATION	SPRINGFIELD MISSOURI
UNIT RATING	200 MW
FUEL CHARACTERISTICS	COAL 3.9 PERCENT SULFUR
FGD VENDOR	UNIVERSAL OIL PRODUCTS
PROCESS	LIMESTONE
NEW OR RETROFIT	NEW
START UP DATE	4/77
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.8 PERCENT
(DESIGN)	99.7 PERCENT
SO2 (ACTUAL)	92.0 PERCENT
(DESIGN)	80.0 PERCENT
WATER MAKE UP	
SLUDGE DISPOSAL	FILTER LAKE LANDFILL
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

FEB. 78

MAR. 78

THE ABSORBERS DID NOT OPERATE DUE TO AN EXPANSION JOINT FAILURE BETWEEN THE ID FAN AND THE ABSORBERS. CURRENTLY, THE ABSORBERS ARE BEING BY-PASSED. THE FGD SYSTEM IS EXPECTED TO BE BACK ON LINE BY THE END OF APRIL.

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME: TENNESSEE VALLEY AUTHORITY

UNIT NAME: SHAWNEE NO.10A

UNIT LOCATION: PADUCAH KENTUCKY

UNIT RATING: 10 MW

FUEL CHARACTERISTICS: COAL 2.9 PERCENT SULFUR

FGD VENDOR: UNIVERSAL OIL PRODUCTS

PROCESS: LIME/LIMESTONE

NEW OR RETROFIT: RETROFIT

START UP DATE: 4/72

EFFICIENCY:
PARTICULATES (ACTUAL) EXPERIMENTALLY CONTROLLED
(DESIGN)

SO2 (ACTUAL) EXPERIMENTALLY CONTROLLED
(DESIGN)

WATER MAKE UP: EXPERIMENTALLY CONTROLLED

SLUDGE DISPOSAL: EXPERIMENTALLY CONTROLLED

UNIT COST

OPERATING EXPERIENCE UPDATE:

FEB. 78
MAR. 78
REFER TO OPERATING EXPERIENCE UPDATE FOR SHAWNEE NO. 10B.

SECTION 3

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	TENNESSEE VALLEY AUTHORITY
UNIT NAME	SHAWNEE NO.10B
UNIT LOCATION	PADUCAH KENTUCKY
UNIT RATING	10 MW
FUEL CHARACTERISTICS	COAL 2.9 PERCENT SULFUR
FGD VENDOR	CHEMICO
PROCESS	LIME/LIMESTONE
NEW OR RETROFIT	RETROFIT
START UP DATE	4/72
EFFICIENCY:	
PARTICULATES (ACTUAL)	EXPERIMENTALLY CONTROLLED
(DESIGN)	
SO2 (ACTUAL)	EXPERIMENTALLY CONTROLLED
(DESIGN)	
WATER MAKE UP	EXPERIMENTALLY CONTROLLED
SLUDGE DISPOSAL	EXPERIMENTALLY CONTROLLED
UNIT COST	

OPERATING EXPERIENCE UPDATE:

FEB. 78
MAR. 78 MAJOR SYSTEM DOWNTIMES DURING THE PERIOD INCLUDED: JANUARY 26 THROUGH FEBRUARY 4 FOR THE VENTURI/SPRAY TOWER AND JANUARY 26 THROUGH FEBRUARY 2 FOR THE TCA SYSTEM DUE TO FREEZING WEATHER, AND MARCH 6 THROUGH MARCH 17 FOR BOTH SYSTEMS DUE TO BOILER OUTAGE.
THE EFFECT OF THE SLURRY LEVEL IN THE AIR SPARGED OXIDATION TANK WAS INVESTIGATED IN THE TWO SCRUBBER LOOP VENTURI/SPRAY TOWER SYSTEM WHICH IS OPERATING ON LIME SLURRY WITH HIGH FLY ASH LOADING. NEAR COMPLETE SULFITE OXIDATION (98 PERCENT) WAS ACHIEVED WITH 14 FOOT AND 18 FOOT OXIDATION TANK LEVELS AT AN AIR STOICHIOMETRIC RATIO OF 1.8 ATOMS OXYGEN/MOLE SO2 ABSORBED. AN AIR STOICHIOMETRIC RATIO UP TO ABOUT 3.8 WAS NEEDED TO YIELD NEAR COMPLETE OXIDATION WHEN THE TANK LEVEL WAS DROPPED TO 10 FEET.
A NEW TEST BLOCK WAS STARTED ON MARCH 1 ON THE VENTURI/SPRAY TOWER SYSTEM. MAGNESIUM OXIDE WAS ADDED TO THE SPRAY TOWER SLURRY LOOP IN A TWO SCRUBBER LOOP OPERATION WITH FORCED OXIDATION IN THE VENTURI LOOP. THE SYSTEM WAS OPERATED WITH LIMESTONE SLURRY WITH HIGH FLY ASH LOADING. THE PRIMARY OBJECTIVE OF MAGNESIUM ADDITION IS TO IMPROVE THE SO2 REMOVAL EFFICIENCY. BECAUSE OF THE SHORTAGE OF COAL CAUSED BY THE COAL MINERS' STRIKE, COALS FROM DIFFERENT SOURCES WERE BURNED IN THE BOILER. AS A RESULT, INLET SO2 CONCENTRATION FLUCTUATED AS MUCH AS TENFOLD (350-3500 PPM), CAUSING PROBLEMS IN SYSTEM CONTROL.
TCA WAS OPERATED WITH BOTH LIME AND LIMESTONE SCRUBBING AND WITH MAGNESIUM OXIDE ADDITION. FLUE GAS WITH HIGH FLY ASH LOADING WAS USED. THESE TESTS WERE CONDUCTED PRIMARILY TO RESOLVE SOME OF THE INCONSISTENT RESULTS OBTAINED DURING EARLIER LIME/MGO AND LIMESTONE/MGO TESTS MADE IN APRIL-NOVEMBER 1976. AIR LEAKAGE THROUGH THE SCRUBBER DOWNCOMER WAS SUSPECTED IN SOME OF THOSE EARLIER RUNS, RESULTING IN HIGHER-THAN-NORMAL SULFITE OXIDATION AND GYPSUM SATURATION. TEST RESULTS SO FAR WERE INCONCLUSIVE BECAUSE OF THE FLUCTUATION IN INLET SO2 AND CONTROL PROBLEMS MENTIONED ABOVE.

SECTION 5

PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME — TENNESSEE VALLEY AUTHORITY

UNIT NAME — WIDOWS CREEK NO. 8

UNIT LOCATION — BRIDGEPORT ALABAMA

UNIT RATING — 550 MW

FUEL CHARACTERISTICS — COAL 3.7 PERCENT SULFUR

FGD VENDOR — TENNESSEE VALLEY AUTHORITY

PROCESS — LIMESTONE

NEW OR RETROFIT — RETROFIT

START UP DATE — 5/77

EFFICIENCY:

PARTICULATES (ACTUAL)

(DESIGN) 99.5 PERCENT

SO2 (ACTUAL)

(DESIGN) 80.0 PERCENT

WATER MAKE UP

SLUDGE DISPOSAL — 100-ACRE DIKED POND

UNIT COST — SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

MONTH	BOILER	OPERATING HOURS A-SIDE	B-SIDE	C-SIDE	D-SIDE	COMMENTS
FEB. 78	586	171	401	370	314	* THE UTILITY REPORTED THAT THEY COULD NOT ACCURATELY DETERMINE RELIABILITY BECAUSE OF THEIR INABILITY TO CALCULATE UNIT LOAD DEMAND ON A DAILY BASIS. HOWEVER, ASSUMING FGD SYSTEM OUTAGE HOURS + HOURS FGD SYSTEM OPERATED EQUALS HOURS THE SYSTEM IS CALLED UPON TO OPERATE, THE RELIABILITY WILL BE 61%. THE OUTAGE TIME FOR TRAINS A AND B WAS REQUIRED TO REPLACE THE RUBBER LINERS IN THE DOWNCOMER AREA WITH STAINLESS STEEL. THIS WILL BE DONE TO THE REMAINING TWO TRAINS AS WELL.

AVAILABILITY = 55%
OPERABILITY = 54%
RELIABILITY = 61% *
UTILIZATION = 47%

SECTION 3
PERFORMANCE DESCRIPTION FOR OPERATIONAL FGD SYSTEMS THROUGH 03/78

UTILITY NAME	TEXAS UTILITIES CO.
UNIT NAME	MARTIN LAKE NO. 1
UNIT LOCATION	TATUM TEXAS
UNIT RATING	793 MW
FUEL CHARACTERISTICS	COAL 1.0 PERCENT SULFUR
FGD VENDOR	RESEARCH COTTRELL
PROCESS	LIMESTONE
NEW OR RETROFIT	NEW
START UP DATE	8/77
EFFICIENCY:	
PARTICULATES (ACTUAL)	99.4 PERCENT
(DESIGN)	
SO2 (ACTUAL)	70.5 PERCENT (TOTAL)
(DESIGN)	
WATER MAKE UP	
SLUDGE DISPOSAL	STABILIZED/ON-SITE DISPOSAL
UNIT COST	SEE APPENDIX A, FGD SYSTEM ECONOMICS

OPERATING EXPERIENCE UPDATE:

FEBRUARY-MARCH 1978 - CERTIFICATION WAS RECEIVED FROM THE EPA FOR THIS UNIT AND THE BOILER AND SCRUBBER-ABSORBER SYSTEM OPERATED THROUGHOUT THE PERIOD. THE UTILITY IS STILL HAVING SOME PROBLEMS WITH THE SLURRY HANDLING SYSTEM, AND SOME FORCED OUTAGE TIME OCCURRED.

SECTION 4
SUMMARY OF FGD SYSTEMS BY COMPANY

UTILITY	TOTAL		STATUS- OPERATIONAL		CONSTRUCTION		CONTRACT AWARDED		PLANNED	
	NO	MW	NO	MW	NO	MW	NO	MW	NO	MW
ALABAMA ELECTRIC COOP	2	450.	0	0.	2	450.	0	0.	0	0.
ALLEGHENY POWER SYSTEM	2	1250.	0	0.	2	1250.	0	0.	0	0.
ARIZONA ELECTRIC POWER COOP	2	400.	0	0.	2	400.	0	0.	0	0.
ARIZONA PUBLIC SERVICE	8	2804.	1	115.	1	250.	1	350.	5	2089.
BASIN ELECTRIC POWER COOP	5	2550.	0	0.	2	1100.	0	0.	3	1450.
BIG RIVERS ELECTRIC COOP CORP.	2	490.	0	0.	2	490.	0	0.	0	0.
BOARD OF MUNICIPAL UTILITIES	1	235.	0	0.	1	235.	0	0.	0	0.
BRAZOS ELECTRIC POWER COOP	1	400.	0	0.	1	400.	0	0.	0	0.
CENTRAL ILLINOIS LIGHT CO.	2	800.	0	0.	1	400.	0	0.	1	400.
CENTRAL ILLINOIS PUBLIC SERV	1	575.	0	0.	1	575.	0	0.	0	0.
CENTRAL MAINE POWER CO.	1	600.	0	0.	0	0.	0	0.	1	600.
CINCINNATI GAS & ELECTRIC CO.	1	600.	0	0.	0	0.	1	600.	0	0.
COLORADO UTE ELECTRIC ASSN.	2	900.	0	0.	2	900.	0	0.	0	0.
COLUMBUS & SOUTHERN OHIO ELEC.	4	1550.	2	800.	0	0.	0	0.	2	750.
COMMONWEALTH EDISON	1	425.	0	0.	1	425.	0	0.	0	0.
COOPERATIVE POWER ASSOCIATION	2	1090.	0	0.	2	1090.	0	0.	0	0.
DELMARVA POWER CO.	1	180.	0	0.	1	180.	0	0.	0	0.
DUQUESNE LIGHT	2	920.	2	920.	0	0.	0	0.	0	0.
EASTERN KENTUCKY POWER COOP	1	500.	0	0.	0	0.	0	0.	1	500.
GENERAL PUBLIC UTILITIES	1	800.	0	0.	0	0.	0	0.	1	800.
HOOSIER COOPERATIVE	2	980.	0	0.	0	0.	2	980.	0	0.
INDIANAPOLIS POWER & LIGHT CO.	2	1060.	1	530.	0	0.	0	0.	1	530.
KANSAS CITY POWER & LIGHT	3	1060.	3	1060.	0	0.	0	0.	0	0.
KANSAS POWER & LIGHT	4	1885.	2	525.	2	1360.	0	0.	0	0.
KENTUCKY UTILITIES	1	64.	1	64.	0	0.	0	0.	0	0.
LAKELAND UTILITIES	1	350.	0	0.	0	0.	1	350.	0	0.
LOUISVILLE GAS & ELECTRIC	8	2283.	3	426.	3	1197.	0	0.	2	660.
MINNESOTA POWER AND LIGHT CO.	1	500.	0	0.	1	500.	0	0.	0	0.
MINNKOTA POWER COOPERATIVE	1	450.	1	450.	0	0.	0	0.	0	0.
MONTANA POWER CO.	4	2120.	2	720.	0	0.	2	1400.	0	0.
NEVADA POWER	10	3000.	3	375.	0	0.	0	0.	7	2625.
NEW ENGLAND ELEC SYSTEM	1	650.	0	0.	0	0.	0	0.	1	650.
NIAGARA MOHAWK POWER COOP.	1	100.	0	0.	0	0.	1	100.	0	0.
NORTHERN INDIANA PUB SERVICE	3	705.	1	115.	0	0.	0	0.	2	590.
NORTHERN STATES POWER CO.	4	3140.	2	1420.	0	0.	2	1720.	0	0.
OTTER TAIL POWER COMPANY	1	400.	0	0.	0	0.	1	400.	0	0.
PACIFIC GAS AND ELECTRIC	2	1600.	0	0.	0	0.	0	0.	2	1600.
PACIFIC POWER AND LIGHT CO.	1	509.	0	0.	1	509.	0	0.	0	0.
PENNSYLVANIA POWER CO.	3	2475.	2	1650.	0	0.	1	825.	0	0.
PHILADELPHIA ELECTRIC CO.	4	846.	1	120.	0	0.	0	0.	3	726.
PUBLIC SERVICE CO OF NEW MEX.	4	1715.	1	375.	2	840.	0	0.	1	500.
PUBLIC SERVICE OF INDIANA	1	650.	0	0.	0	0.	0	0.	1	650.
SALT RIVER PROJECT	5	1050.	0	0.	2	700.	0	0.	1	350.
SOUTH CAROLINA PUBLIC SERVICE	2	580.	1	280.	0	0.	1	300.	0	0.
SOUTHERN ILLINOIS POWER COOP	1	184.	0	0.	1	184.	0	0.	0	0.
SOUTHERN INDIANA GAS&ELECTRIC	1	250.	0	0.	1	250.	0	0.	0	0.
SOUTHERN MISSISSIPPI ELECTRIC	2	360.	0	0.	2	360.	0	0.	0	0.
SPRINGFIELD CITY UTILITIES	1	200.	1	200.	0	0.	0	0.	0	0.
SPRINGFIELD WATER LIGHT&POWER	1	190.	0	0.	0	0.	1	190.	0	0.
TENNESSEE VALLEY AUTHORITY	4	1145.	3	570.	0	0.	1	575.	0	0.
TEXAS MUNICIPAL POWER AGENCY	1	400.	0	0.	0	0.	1	400.	0	0.
TEXAS POWER AND LIGHT CO.	3	2045.	0	0.	1	545.	0	0.	2	1500.
TEXAS UTILITIES CO.	6	4672.	1	793.	3	2336.	1	793.	1	750.
UTAH POWER & LIGHT CO.	2	815.	0	0.	2	815.	0	0.	0	0.
WISCONSIN POWER & LIGHT CO.	1	527.	0	0.	0	0.	0	0.	1	527.
TOTALS	132	56479.	34	11508.	42	17741.	17	8983.	39	18247.

NOTE - PLANNED STATUS INCLUDES LETTER OF INTENT SIGNED, REQUESTING/EVALUTING BIDS, AND CONSIDERING ONLY FGD SYSTEMS

SECTION 5
SUMMARY OF FGD SYSTEMS BY VENDOR

MANUFACTURER/PROCESS	TOTAL		STATUS: OPERATIONAL		STATUS: CONSTRUCTION		STATUS: CONTRACT AWARDED	
	NO.	MW	NO.	MW	NO.	MW	NO.	MW
ADL/COMBUSTION EQUIP ASSOCIATE								
DOUBLE ALKALI	1	277.	0	0.	1	277.	0	0.
LIME/ALKALINE FLYASH	5	2570.	3	1170.	0	0.	2	1400.
SODIUM CARBONATE	3	375.	3	375.	0	0.	0	0.
TOTAL =	9	3222.	6	1545.	1	277.	2	1400.
AMERICAN AIR FILTER								
LIME	6	1652.	2	242.	4	1410.	0	0.
TOTAL =	6	1652.	2	242.	4	1410.	0	0.
ATOMICS INTERNATIONAL								
AQUEOUS CARBONATE	1	100.	0	0.	0	0.	1	100.
TOTAL =	1	100.	0	0.	0	0.	1	100.
BABCOCK & WILCOX								
LIME	3	1850.	0	0.	2	1250.	1	600.
LIMESTONE	5	1919.	2	1100.	3	819.	0	0.
NOT SELECTED	1	300.	0	0.	0	0.	1	300.
TOTAL =	9	4069.	2	1100.	5	2069.	2	900.
BUELL/ENVIROTECH								
DOUBLE ALKALI	1	575.	0	0.	1	575.	0	0.
TOTAL =	1	575.	0	0.	1	575.	0	0.
CHEMICO								
LIME	6	3385.	4	2570.	2	815.	0	0.
LIME/LIMESTONE	1	10.	1	10.	0	0.	0	0.
LIMESTONE	1	750.	0	0.	1	750.	0	0.
TOTAL =	8	4145.	5	2580.	3	1565.	0	0.
COMBUSTION ENGINEERING								
LIME	6	1578.	4	488.	2	1090.	0	0.
LIMESTONE	11	6545.	4	1945.	3	1905.	4	2695.
TOTAL =	17	8123.	8	2433.	5	2995.	4	2695.
DAVY POWERGAS								
WELLMAN LORD	2	680.	0	0.	2	680.	0	0.
TOTAL =	2	680.	0	0.	2	680.	0	0.
DAVY POWERGAS/ALLIED CHEMICAL								
WELLMAN LORD/ALLIED CHEMICAL	3	830.	2	490.	1	340.	0	0.
TOTAL =	3	830.	2	490.	1	340.	0	0.
FMC CORPORATION								
DOUBLE ALKALI	1	250.	0	0.	1	250.	0	0.
TOTAL =	1	250.	0	0.	1	250.	0	0.
NOT SELECTED								
LIMESTONE	3	1330.	0	0.	0	0.	3	1330.
TOTAL =	3	1330.	0	0.	0	0.	3	1330.
PEABODY ENGINEERING								
LIME/ALKALINE FLYASH	1	500.	0	0.	1	500.	0	0.
LIMESTONE	4	1350.	0	0.	4	1350.	0	0.
TOTAL =	5	1850.	0	0.	5	1850.	0	0.
PULLMAN KELLOGG								
LIME	1	825.	0	0.	0	0.	1	825.
LIMESTONE	2	700.	0	0.	2	700.	0	0.
TOTAL =	3	1525.	0	0.	2	700.	1	825.
RESEARCH COTTRELL								
LIMESTONE	12	5577.	2	908.	7	3336.	3	1333.
TOTAL =	12	5577.	2	908.	7	3336.	3	1333.
RILEY STOKER / ENVIROENEERING								
LIMESTONE	3	760.	0	0.	3	760.	0	0.

SECTION 5
SUMMARY OF FGD SYSTEMS BY VENDOR

MANUFACTURER/PROCESS	TOTAL NO.	TOTAL MW	STATUS: OPERATIONAL NO.	OPERATIONAL MW	CONSTRUCTION NO.	CONSTRUCTION MW	CONTRACT AWARDED NO.	CONTRACT AWARDED MW
TOTAL -	3	760.	0	0.	3	760.	0	0.
TENNESSEE VALLEY AUTHORITY								
LIMESTONE	1	550.	1	550.	0	0.	0	0.
TOTAL -	1	550.	1	550.	0	0.	0	0.
UNITED ENGINEERS / PECO								
MAGNESIUM OXIDE	1	120.	1	120.	0	0.	0	0.
TOTAL -	1	120.	1	120.	0	0.	0	0.
UNIVERSAL OIL PRODUCTS								
LIME	2	800.	2	800.	0	0.	0	0.
LIME/LIMESTONE	1	10.	1	10.	0	0.	0	0.
LIMESTONE	3	1155.	2	730.	1	425.	0	0.
SODIUM CARBONATE	1	509.	0	0.	1	509.	0	0.
TOTAL -	7	2474.	5	1540.	2	934.	0	0.
WHEELABRATOR-FRYE/A.I.								
AQUEOUS CARBONATE/FAB. FILTER	1	400.	0	0.	0	0.	1	400.
TOTAL -	1	400.	0	0.	0	0.	1	400.
	93	38232.	34	11508.	42	17741.	17	8983.

SECTION 6
SUMMARY OF NEW AND RETROFIT FGD SYSTEMS BY PROCESS

PROCESS	NEW OR RETROFIT	OPERATIONAL NO.	OPERATIONAL MW	CONSTRUCTION NO.	CONSTRUCTION MW	CONTRACT AWARDED NO.	CONTRACT AWARDED MW	PLANNED NO.	PLANNED MW	TOTAL NO. OF PLANTS NO.	TOTAL NO. OF PLANTS MW
LIME SCRUBBING	N	0	0	0	0	0	0	0	0	0	0
	R	0	0	0	0	0	0	0	0	0	0
LIME	N	4	2450	10	4565	2	1425	0	0	16	8440
	R	8	1650	0	0	0	0	2	660	10	2310
LIME/ALKALINE FLYASH	N	3	1170	1	500	2	1400	1	527	7	3597
	R	0	0	0	0	0	0	3	579	3	579
LIME/LIMESTONE	N	0	0	0	0	0	0	0	0	0	0
	R	2	20	0	0	0	0	0	0	2	20
LIMESTONE	N	8	4443	23	9620	9	4783	5	2880	45	21726
	R	3	790	1	425	1	575	0	0	5	1790
SUBTOTAL - LIME/LIMESTONE	N	15.	8063.	34.	14685.	13.	7608.	6.	3407.	68.	33763.
	R	13.	2460.	1.	425.	1.	575.	5.	1239.	20.	4699.
AQUEOUS CARBONATE	N	0	0	0	0	0	0	0	0	0	0
	R	0	0	0	0	1	100	0	0	1	100
AQUEOUS CARBONATE/FAB. FILTER	N	0	0	0	0	1	400	0	0	1	400
	R	0	0	0	0	0	0	0	0	0	0
DOUBLE ALKALI	N	0	0	2	825	0	0	0	0	2	825
	R	0	0	1	277	0	0	0	0	1	277
MAGNESIUM OXIDE	N	0	0	0	0	0	0	0	0	0	0
	R	1	120	0	0	0	0	3	726	4	846
NOT SELECTED	N	0	0	0	0	1	300	18	9500	19	9800
	R	0	0	0	0	0	0	4	2100	4	2100
REGENERABLE NOT SELECTED	N	0	0	0	0	0	0	0	0	0	0
	R	0	0	0	0	0	0	1	650	1	650
SODIUM CARBONATE	N	1	125	1	509	0	0	1	125	3	759
	R	2	250	0	0	0	0	0	0	2	250
WELLMAN LORD	N	0	0	1	500	0	0	1	500	2	1000
	R	0	0	1	180	0	0	0	0	1	180
WELLMAN LORD/ALLIED CHEMICAL	N	1	375	0	0	0	0	0	0	1	375
	R	1	115	1	340	0	0	0	0	2	455
TOTALS	N	17.	6563.	38.	16519.	15.	8308.	26.	13532.	96.	46922.
	R	17.	2945.	4.	1222.	2.	675.	13.	4715.	36.	9557.
LIME/LIMESTONE % OF TOTAL MW	N		94		89		92		25		72
	R		84		35		85		26		49

SECTION 7
SUMMARY OF OPERATING FGD SYSTEMS BY
PROCESS AND GENERATING UNITS AS OF 03/78

PROCESS/GENERATING UNITS	FGD/MW	STARTUP	EXPERIENCE(MO.)
LIME			
BRUCE MANSFIELD NO. 1	825	4-76	23
BRUCE MANSFIELD NO. 2	825	7-77	8
CANE RUN NO 4	178	8-76	19
CANE RUN NO 5	183	12-77	3
CONESVILLE NO 5	400	1-77	14
CONESVILLE NO 6	400	4-78	0
ELRAMA POWER STATION	510	10-75	29
GREEN RIVER NOS. 1 2 AND 3	64	9-75	30
HAWTHORN NO. 3	140	11-72	64
HAWTHORN NO. 4	140	8-72	67
PADDYS RUN NO 6	65	4-73	59
PHILLIPS POWER STATION	410	7-73	56
	4100.		372
LIME/ALKALINE FLYASH			
COLSTRIP NO 1	360	11-75	28
COLSTRIP NO 2	360	7-76	20
MILTON R. YOUNG NO. 2	450	9-77	6
	1170.		54
LIME/LIMESTONE			
SHAWNEE NO.10A	10	4-72	71
SHAWNEE NO.10B	10	4-72	71
	20.		142
LIMESTONE			
CHOLLA NO 1	115	10-73	53
LA CYGNE NO 1	820	2-73	61
LAWRENCE NO 4	125	12-68	111
LAWRENCE NO 5	400	11-71	76
MARTIN LAKE NO. 1	793	8-77	7
PETERSBURG NO 3	530	10-77	5
SHERBURNE COUNTY STATION NO.1	710	3-76	24
SHERBURNE COUNTY STATION NO.2	710	4-77	11
SOUTHWEST NO. 1	200	4-77	11
WIDOWS CREEK NO. 8	550	5-77	10
WINYAH NO. 2	280	7-77	8
	5233.		377
MAGNESIUM OXIDE			
EDDYSTONE NO. 1A	120	9-75	30
	120.		30
SODIUM CARBONATE			
REID GARDNER NO 1	125	4-74	47
REID GARDNER NO 2	125	4-74	47
REID GARDNER NO 3	125	7-76	20
	375.		114
WELLMAN LORD/ALLIED CHEMICAL			
DEAN H. MITCHELL NO. 11	115	11-76	16
SAN JUAN NO. 1	375	4-78	0
	490.		16

SECTION 8
SUMMARY OF SLUDGE DISPOSAL PRACTICES FOR OPERATIONAL FGD SYSTEMS AS OF 03/78

PROCESS/GENERATING UNIT	--SLUDGE-- STABILIZED	--SLUDGE-- UNSTABILIZED	---POND--- LINED	---POND--- UNLINED
LIME				
BRUCE MANSFIELD NO. 1	825			
BRUCE MANSFIELD NO. 2	825			
CANE RUN NO 4	178			178
CANE RUN NO 5	183			183
CONESVILLE NO 5	400			400
CONESVILLE NO 6	400			400
ELWANA POWER STATION	510			510
GREEN RIVER NOS. 1 2 AND 3		64		64
HAWTHORN NO. 3		140		140
HAWTHORN NO. 4		100		100
PADDYS RUN NO 6	65			65
PHILLIPS POWER STATION	410			410
TOTAL	3796.	304.	0.	2450.
LIME/ALKALINE FLYASH				
COLSTRIP NO 1		360	360	
COLSTRIP NO 2		360		360
MILTON R. YOUNG NO. 2		450		
TOTAL	0.	1170.	360.	360.
LIMESTONE				
CHOLLA NO 1		115		115
LA CYGNE NO 1		820		820
LAWRENCE NO 4		125		125
LAWRENCE NO 5		400		400
MARTIN LAKE NO. 1	793		793	
PETERSBURG NO 3	530			530
SHERBURNE COUNTY STATION NO.1		710	710	
SHERBURNE COUNTY STATION NO.2		710	710	
WIDOWS CREEK NO. 8		550		550
WINYAH NO. 2		280		280
TOTAL	1323.	3710.	2213.	2820.
SODIUM CARBONATE				
REID GARDNER NO 1		125		
REID GARDNER NO 2		125		
REID GARDNER NO 3		125		
TOTAL	0.	375.	0.	0.

SECTION 9
SUMMARY OF FGD SYSTEMS BY PROCESS AND REGULATORY CLASS

PROCESS	REGULATORY CLASS	OPERATIONAL NO.	OPERATIONAL MW	CONSTRUCTION NO.	CONSTRUCTION MW	CONTRACT AWARDED NO.	CONTRACT AWARDED MW	PLANNED NO.	PLANNED MW	TOTAL NO. PLANTS NO.	TOTAL NO. PLANTS MW
LIME	A	0	0	9	4140	1	600	0	0	10	4740
	B	10	3971	1	425	1	825	2	660	14	5881
	C	2	129	0	0	0	0	0	0	2	129
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
LIME/ALKALINE FLYASH	A	0	0	1	500	0	0	1	527	2	1027
	B	3	1170	0	0	2	1400	3	579	8	3149
	C	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
LIME/LIMESTONE	A	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0
	C	2	20	0	0	0	0	0	0	2	20
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
LIMESTONE	A	9	1803	12	4910	6	2713	2	930	24	10356
	B	5	2060	11	4710	2	1720	3	1950	21	10440
	C	2	1370	1	425	1	575	0	0	4	2370
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	1	350	0	0	1	350
SUBTOTAL - LIME/LIMESTONE	A	9.	1803.	22.	9550.	7.	3313.	3.	1457.	36.	16123.
	B	18.	7201.	12.	5135.	5.	3945.	8.	3189.	43.	19470.
	C	6.	1519.	1.	425.	1.	575.	0.	0.	8.	2519.
	D	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	E	0.	0.	0.	0.	1.	350.	0.	0.	1.	350.
AQUEOUS CARBONATE	A	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	1	100	0	0	1	100
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
AQUEOUS CARBONATE/FAB. FILTER	A	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	1	400	0	0	1	400
	C	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
DUUBLE ALKALI	A	0	0	2	825	0	0	0	0	2	825
	B	0	0	1	277	0	0	0	0	1	277
	C	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
MAGNESIUM OXIDE	A	0	0	0	0	0	0	0	0	0	0
	B	1	120	0	0	0	0	3	726	4	846
	C	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0

A. BOILER CONSTRUCTED SUBJECT TO FEDERAL NSPS
B. BOILER SUBJECT TO STATE STANDARD THAT IS MORE STRINGENT THAN THE FEDERAL NSPS
C. BOILER SUBJECT TO STATE STANDARD THAT IS EQUAL TO OR LESS STRINGENT THAN NSPS
D. OTHER
E. REGULATORY CLASS UNKNOWN

SECTION 9
SUMMARY OF FGD SYSTEMS BY PROCESS AND REGULATORY CLASS

PROCESS	REGULATORY CLASS	OPERATIONAL NO.	OPERATIONAL MW	CONSTRUCTION NO.	CONSTRUCTION MW	CONTRACT AWARDED NO.	CONTRACT AWARDED MW	PLANNED NO.	PLANNED MW	TOTAL NO. PLANTS NO.	TOTAL NO. PLANTS MW
NOT SELECTED	A	0	0	0	0	1	300	7	4800	8	5100
	B	0	0	0	0	0	0	13	6210	13	6210
	C	0	0	0	0	0	0	2	590	2	590
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
REGENERABLE NOT SELECTED	A	0	0	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	1	650	1	650
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
SODIUM CARBONATE	A	0	0	0	0	0	0	0	0	0	0
	B	3	375	1	509	0	0	1	125	5	1009
	C	0	0	0	0	0	0	0	0	0	0
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
WELLMAN LORD	A	0	0	0	0	0	0	0	0	0	0
	B	0	0	1	500	0	0	1	500	2	1000
	C	0	0	1	180	0	0	0	0	1	180
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
WELLMAN LORD/ALLIED CHEMICAL	A	0	0	0	0	0	0	0	0	0	0
	B	1	375	1	340	0	0	0	0	2	715
	C	1	115	0	0	0	0	0	0	1	115
	D	0	0	0	0	0	0	0	0	0	0
	E	0	0	0	0	0	0	0	0	0	0
TOTALS	A	4.	1803.	24.	10375.	8.	3613.	10.	6257.	46.	22048.
	B	23.	8071.	16.	6761.	6.	4345.	26.	10750.	71.	29927.
	C	7.	1634.	2.	605.	2.	675.	3.	1240.	14.	4154.
	D	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	E	0.	0.	0.	0.	1.	350.	0.	0.	1.	350.
LIME/STONE % OF TOTAL MW	A	100		92		92		23		73	
	B	89		76		91		30		65	
	C	93		70		85		0		61	
	D	0		0		0		0		0	
	E	0		0		100		0		100	

A. BOILER CONSTRUCTED SUBJECT TO FEDERAL NSPS
B. BOILER SUBJECT TO STATE STANDARD THAT IS MORE STRINGENT THAN THE FEDERAL NSPS
C. BOILER SUBJECT TO STATE STANDARD THAT IS EQUAL TO OR LESS STRINGENT THAN NSPS
D. OTHER
E. REGULATORY CLASS UNKNOWN

SECTION 10
SUMMARY OF FGD SYSTEMS UNDER CONSTRUCTION AS OF 03/78

UTILITY COMPANY POWER STATION	NEW OR RETROFIT	SIZE OF FGD UNIT (MW)	PROCESS/VENDOR	START-UP DATE
ALABAMA ELECTRIC COOP TOMBIGBEE 2	N	225	PEABODY ENGINEERING LIMESTONE	6/78
ALABAMA ELECTRIC COOP TOMBIGBEE 3	N	225	PEABODY ENGINEERING LIMESTONE	6/79
ALLEGHENY POWER SYSTEM PLEASANTS 1	N	625	BABCOCK & WILCOX LIME	3/79
ALLEGHENY POWER SYSTEM PLEASANTS 2	N	625	BABCOCK & WILCOX LIME	3/80
ARIZONA ELECTRIC POWER COOP APACHE NO 2	N	200	RESEARCH COTTRELL LIMESTONE	6/78
ARIZONA ELECTRIC POWER COOP APACHE NO 3	N	200	RESEARCH COTTRELL LIMESTONE	6/79
ARIZONA PUBLIC SERVICE CHOLLA NO 2	N	250	RESEARCH COTTRELL LIMESTONE	6/78
BASIN ELECTRIC POWER COOP LARAMIE RIVER NO. 1	N	550	RESEARCH COTTRELL LIMESTONE	6/80
BASIN ELECTRIC POWER COOP LARAMIE RIVER NO. 2	N	550	RESEARCH COTTRELL LIMESTONE	10/80
BIG RIVERS ELECTRIC COOP CORP. REID NO. 2	N	250	AMERICAN AIR FILTER LIME	12/79
BIG RIVERS ELECTRIC COOP CORP. REID NO. 3	N	240	AMERICAN AIR FILTER LIME	12/80
BOARD OF MUNICIPAL UTILITIES STAESTON POWER STATION	N	235	BABCOCK & WILCOX LIMESTONE	6/81
BRAZOS ELECTRIC POWER COOP SAN MIGUEL NO. 1	N	400	BABCOCK & WILCOX LIMESTONE	6/80
CENTRAL ILLINOIS LIGHT CO. DUCK CREEK NO. 1	N	490	RILEY STOKER / ENVIRONEERING LIMESTONE	6/78
CENTRAL ILLINOIS PUBLIC SERV NEWTON NO.1	N	575	BUELL/ENVIROTECH DOUBLE ALKALI	11/79
COLORADO UTE ELECTRIC ASSN. CRAIG NO. 1	N	450	PEABODY ENGINEERING LIMESTONE	3/79
COLORADO UTE ELECTRIC ASSN. CRAIG NO. 2	N	450	PEABODY ENGINEERING LIMESTONE	3/79
COMMONWEALTH EDISON POWERTON NO. 51	N	425	UNIVERSAL OIL PRODUCTS LIMESTONE	12/79
COOPERATIVE POWER ASSOCIATION COAL CREEK NO. 1	N	545	COMBUSTION ENGINEERING LIME	8/79
COOPERATIVE POWER ASSOCIATION COAL CREEK NO. 2	N	545	COMBUSTION ENGINEERING LIME	11/79
DELMARVA POWER CO. DELAWARE CITY NOS. 1 & 3	N	160	DAVY POWERGAS WELLMAN LORD	6/80
KANSAS POWER & LIGHT JEFFERY NO. 1	N	680	COMBUSTION ENGINEERING LIMESTONE	6/78
KANSAS POWER & LIGHT JEFFERY NO. 2	N	680	COMBUSTION ENGINEERING LIMESTONE	6/80
LOUISVILLE GAS & ELECTRIC CANE RUN NO 6	R	277	ADL/COMBUSTION EQUIP ASSOCIATE DOUBLE ALKALI	12/79

SECTION 1V
SUMMARY OF FGD SYSTEMS UNDER CONSTRUCTION AS OF 03/78

UTILITY COMPANY POWER STATION	NEW OR RETROFIT	SIZE OF FGD UNIT (Mw)	PROCESS/VENDOR	START-UP DATE
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 3	R	425	AMERICAN AIR FILTER LIME	7/78
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 4	R	495	AMERICAN AIR FILTER LIME	6/80
MINNESOTA POWER AND LIGHT CO. CLAY BUSHELL NO. 4	R	500	PEABODY ENGINEERING LIME/ALKALINE FLYASH	5/80
PACIFIC POWER AND LIGHT CO. JIM BRIDGER NO. 4	R	509	UNIVERSAL OIL PRODUCTS SODIUM CARBONATE	9/79
PUBLIC SERVICE CO OF NEW MEX. SAN JUAN NO. 2	R	340	DAVY POWERGAS/ALLIED CHEMICAL WELLMAN LORD/ALLIED CHEMICAL	7/78
PUBLIC SERVICE CO OF NEW MEX. SAN JUAN NO. 3	R	500	DAVY POWERGAS WELLMAN LORD	1/79
SALT RIVER PROJECT CORONADO NO.1	R	350	PULLMAN KELLOGG LIMESTONE	4/79
SALT RIVER PROJECT CORONADO NO.2	R	350	PULLMAN KELLOGG LIMESTONE	4/80
SOUTHERN ILLINOIS POWER COOP MARION NO. 4	R	184	BABCOCK & WILCOX LIMESTONE	6/78
SOUTHERN INDIANA GAS&ELECTRIC A.B. BROWN NO.1	R	250	FMC CORPORATION DOUBLE ALKALI	4/79
SOUTHERN MISSISSIPPI ELECTRIC R.D. MORROW NO.1	R	180	RILEY STOKER / ENVIRONEERING LIMESTONE	5/78
SOUTHERN MISSISSIPPI ELECTRIC R.D. MORROW NO.2	R	180	RILEY STOKER / ENVIRONEERING LIMESTONE	8/78
TEXAS POWER AND LIGHT CO. SANDOW NO.4	R	545	COMBUSTION ENGINEERING LIMESTONE	7/80
TEXAS UTILITIES CO. MARTIN LAKE NO. 2	R	793	RESEARCH COTTRELL LIMESTONE	8/78
TEXAS UTILITIES CO. MARTIN LAKE NO. 3	R	793	RESEARCH COTTRELL LIMESTONE	12/78
TEXAS UTILITIES CO. MONTICELLO NO.3	R	750	CHEMICO LIMESTONE	2/78
UTAH POWER & LIGHT CO. HUNTER NO.1	R	400	CHEMICO LIME	12/78
UTAH POWER & LIGHT CO. HUNTINGTON NO.1	R	415	CHEMICO LIME	5/78

SECTION II
SUMMARY OF PLANNED FGD SYSTEMS AS OF 03/78

UTILITY COMPANY POWER STATION	NEW OR RETROFIT	SIZE OF FGD UNIT (MW)	VENDOR/PROCESS	START-UP DATE
CONTRACTS AWARDED				
ARIZONA PUBLIC SERVICE CHOLLA NO. 4		350	RESEARCH COTTRELL LIMESTONE	6/80
CINCINNATI GAS & ELECTRIC CO. EAST BEND NO 2	R	600	BABCOCK & WILCOX LIME	1/81
HOOSIER COOPERATIVE MEROM NO. 1	R	490	NOT SELECTED LIMESTONE	12/80
HOOSIER COOPERATIVE MERON NO. 2	R	490	NOT SELECTED LIMESTONE	10/81
LAKELAND UTILITIES MCINTOSH POWER PLANT UNIT NO.3	R	350	NOT SELECTED LIMESTONE	10/81
MONTANA POWER CO. COLSTRIP NO. 3	R	700	ADL/COMBUSTION EQUIP ASSOCIATE LIME/ALKALINE FLYASH	7/80
MONTANA POWER CO. COLSTRIP NO. 4	R	700	ADL/COMBUSTION EQUIP ASSOCIATE LIME/ALKALINE FLYASH	7/81
NIAGARA MOHAWK POWER COOP. CHARLES R. HUNTLEY NO.6	R	100	ATOMICS INTERNATIONAL AQUEOUS CARBONATE	8/80
NORTHERN STATES POWER CO. SHERBURNE COUNTY STATION NO.3	R	860	COMBUSTION ENGINEERING LIMESTONE	5/81
NORTHERN STATES POWER CO. SHERBURNE COUNTY STATION NO.4	R	860	COMBUSTION ENGINEERING LIMESTONE	5/83
OTTER TAIL POWER COMPANY COYOTE NO. 1	R	400	WHEELABRATOR-FRYE/A.I. AQUEOUS CARBONATE/FAB. FILTER	5/81
PENNSYLVANIA POWER CO. BRUCE MANSFIELD NO. 3	R	825	PULLMAN KELLOGG LIME	4/80
SOUTH CAROLINA PUBLIC SERVICE WINYAH NO. 3	R	300	BABCOCK & WILCOX NOT SELECTED	5/80
SPRINGFIELD WATER LIGHT&POWER DALLMAN NO. 3	R	190	RESEARCH COTTRELL LIMESTONE	7/80
TENNESSEE VALLEY AUTHORITY WIDOWS CREEK NO. 7	R	575	COMBUSTION ENGINEERING LIMESTONE	0/ 0
TEXAS MUNICIPAL POWER AGENCY BIG BROWN CREEK UNIT NO. 1	R	600	COMBUSTION ENGINEERING LIMESTONE	1/82
TEXAS UTILITIES CO. MARTIN LAKE NO. 4	R	793	RESEARCH COTTRELL LIMESTONE	11/82
LETTER OF INTENT SIGNED				
NEVADA POWER REID GARDNER NO 4	R	125	ADL/COMBUSTION EQUIP ASSOCIATE SODIUM CARBONATE	0/ 0
PHILADELPHIA ELECTRIC CO. EDDYSTONE NO. 1B	R	240	UNITED ENGINEERS / PECO MAGNESIUM OXIDE	6/80
WISCONSIN POWER & LIGHT CO. COLUMBIA NO. 2	R	527	CHEMICO LIME/ALKALINE FLYASH	1/80
REQUESTING/EVALUATING BIDS				
BASIN ELECTRIC POWER COOP ANTELOPE VALLEY NO. 1	R	450	NOT SELECTED NOT SELECTED	0/81
BASIN ELECTRIC POWER COOP ANTELOPE VALLEY NO. 2	R	450	NOT SELECTED NOT SELECTED	0/83

SECTION 11
SUMMARY OF PLANNED FGD SYSTEMS AS OF 03/78

UTILITY COMPANY POWER STATION	NEW OR RETROFIT	SIZE OF FGD UNIT (MW)	VENDOR/PROCESS	START-UP DATE
EASTERN KENTUCKY POWER COOP SPURLOCK GENERATING PLANT NO.2	N	500	NOT SELECTED NOT SELECTED	3/80
INDIANAPOLIS POWER & LIGHT CO. PETERSBURG NO 4	N	530	NOT SELECTED LIMESTONE	4/82
CONSIDERING FGD SYSTEM				
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 1	R	175	CHEMICO/APS LIME/ALKALINE FLYASH	0/ 0
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 2	R	175	CHEMICO/APS LIME/ALKALINE FLYASH	0/ 0
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 3	R	229	CHEMICO/APS LIME/ALKALINE FLYASH	0/ 0
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 4	R	755	NOT SELECTED NOT SELECTED	0/ 0
ARIZONA PUBLIC SERVICE FOUR CORNERS NO. 5	R	755	NOT SELECTED NOT SELECTED	0/ 0
BASIN ELECTRIC POWER COOP LARAMIE RIVER NO. 3	N	550	NOT SELECTED NOT SELECTED	4/82
CENTRAL ILLINOIS LIGHT CO. DUCK CREEK NO.2	N	400	NOT SELECTED LIMESTONE	1/82
CENTRAL MAINE POWER CO. SEARS ISLAND NO. 1	N	600	NOT SELECTED NOT SELECTED	11/86
COLUMBUS & SOUTHERN OHIO ELEC. POSTON NO. 5	N	375	NOT SELECTED NOT SELECTED	0/81
COLUMBUS & SOUTHERN OHIO ELEC. POSTON NO. 6	N	375	NOT SELECTED NOT SELECTED	0/83
GENERAL PUBLIC UTILITIES CONO NO.1	N	800	NOT SELECTED NOT SELECTED	5/87
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 1	R	330	NOT SELECTED LIME	1/82
LOUISVILLE GAS & ELECTRIC MILL CREEK NO 2	R	330	NOT SELECTED LIME	1/81
NEVADA POWER HARRY ALLEN STATION NO. 1	N	500	NOT SELECTED NOT SELECTED	6/83
NEVADA POWER HARRY ALLEN STATION NO. 2	N	500	NOT SELECTED NOT SELECTED	6/84
NEVADA POWER HARRY ALLEN STATION NO. 3	N	500	NOT SELECTED NOT SELECTED	6/85
NEVADA POWER HARRY ALLEN STATION NO. 4	N	500	NOT SELECTED NOT SELECTED	6/86
NEVADA POWER WARNER VALLEY STATION NO. 1	N	250	NOT SELECTED NOT SELECTED	6/82
NEVADA POWER WARNER VALLEY STATION NO. 2	N	250	NOT SELECTED NOT SELECTED	6/83
NEW ENGLAND ELEC SYSTEM BRAYTON POINT NO.3	R	650	NOT SELECTED REGENERABLE NOT SELECTED	0/ 0
NORTHERN INDIANA PUB SERVICE BAILLY NO. 7	R	190	NOT SELECTED NOT SELECTED	0/ 0
NORTHERN INDIANA PUB SERVICE BAILLY NO. 8	R	400	NOT SELECTED NOT SELECTED	0/ 0

SECTION 11
SUMMARY OF PLANNED FGD SYSTEMS AS OF 03/78

UTILITY COMPANY POWER STATION	NEW OR RETROFIT	SIZE OF FGD UNIT (MW)	VENDOR/PROCESS	START-UP DATE
PACIFIC GAS AND ELECTRIC FOSSIL NO. 1	N	800	NOT SELECTED LIMESTONE	0/84
PACIFIC GAS AND ELECTRIC FOSSIL NO. 2	N	800	NOT SELECTED LIMESTONE	0/85
PHILADELPHIA ELECTRIC CO. CROMBY	R	150	UNITED ENGINEERS / PECO MAGNESIUM OXIDE	6/80
PHILADELPHIA ELECTRIC CO. EDDYSTONE NO. 2	R	336	UNITED ENGINEERS / PECO MAGNESIUM OXIDE	6/80
PUBLIC SERVICE CO OF NEW MEX. SAN JUAN NO. 4	N	500	DAVY POWERGAS WELLMAN LORD	5/81
PUBLIC SERVICE OF INDIANA GIBSON 5	N	650	NOT SELECTED NOT SELECTED	0/82
SALT RIVER PROJECT CORONADO NO.3	N	350	NOT SELECTED LIMESTONE	0/97
TEXAS POWER AND LIGHT CO. TWIN OAKS NO. 1	N	750	NOT SELECTED NOT SELECTED	8/83
TEXAS POWER AND LIGHT CO. TWIN OAKS NO. 2	N	750	NOT SELECTED NOT SELECTED	9/84
TEXAS UTILITIES CO. FOREST GROVE NO. 1	N	750	NOT SELECTED NOT SELECTED	0/81

SECTION 13

TOTAL FGD MEGAWATT CAPACITY BY YEAR *

YEAR	NO. UNITS	MEGAWATTS
1968	1	125
1971	1	400
1972	4	260
1973	4	1410
1974	2	250
1975	4	1054
1976	6	2313
1977	10	4921
1978	17	6990
1979	15	6176
1980	23	9823
1981	12	6040
1982	8	3903
1983	6	3185
1984	3	2050
1985	2	1300
1986	2	1100
1987	1	800
1997	1	350
UNDEFINED	10	4029

* TOTALS DISPLAYED DO NOT INCLUDE TERMINATED OR INACTIVE SYSTEMS.

APPENDIX B

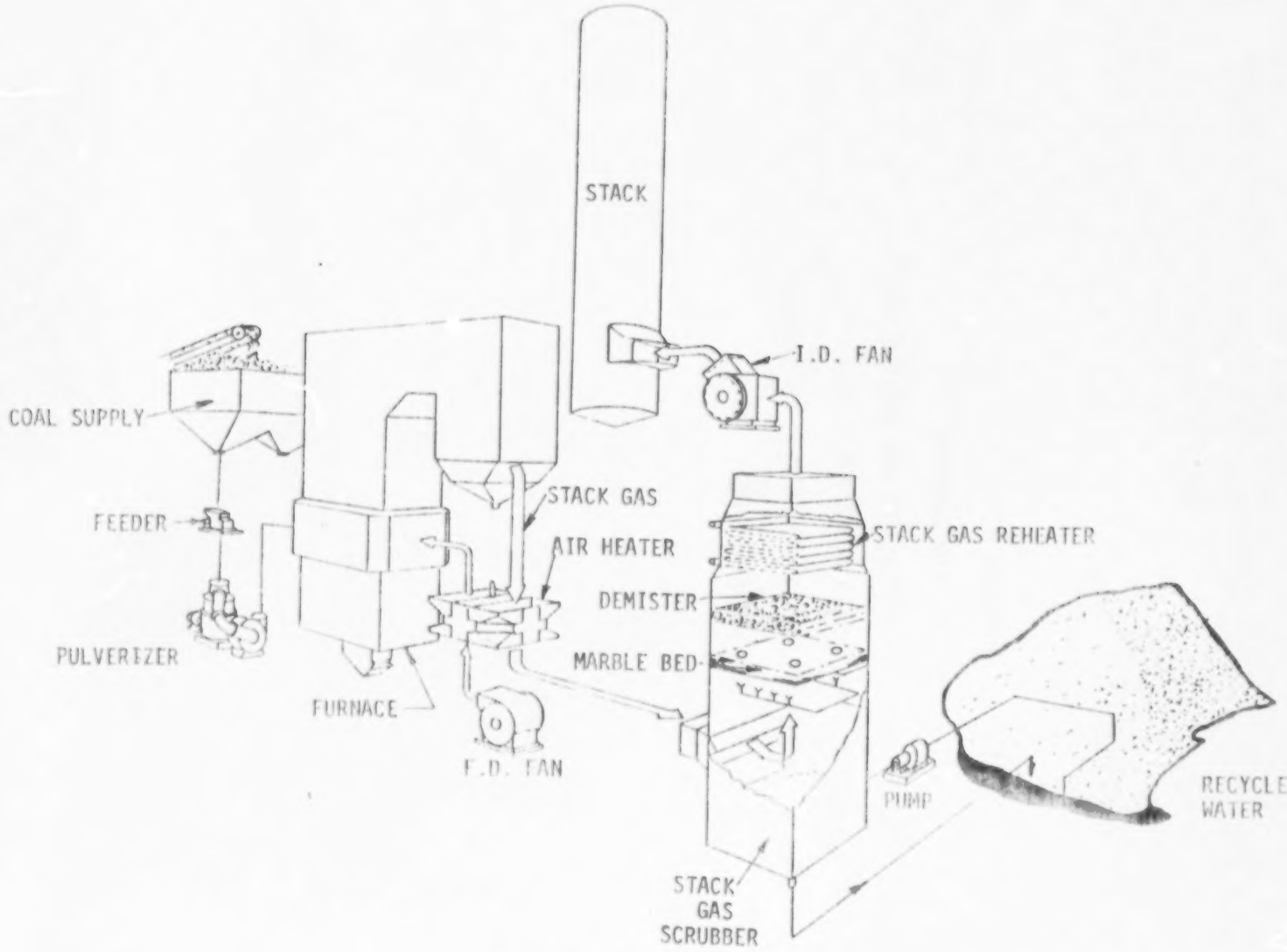
FGD PROCESS FLOW DIAGRAMS

THIS APPENDIX COMPRISES BOTH ACTIVE AND INACTIVE UNITS

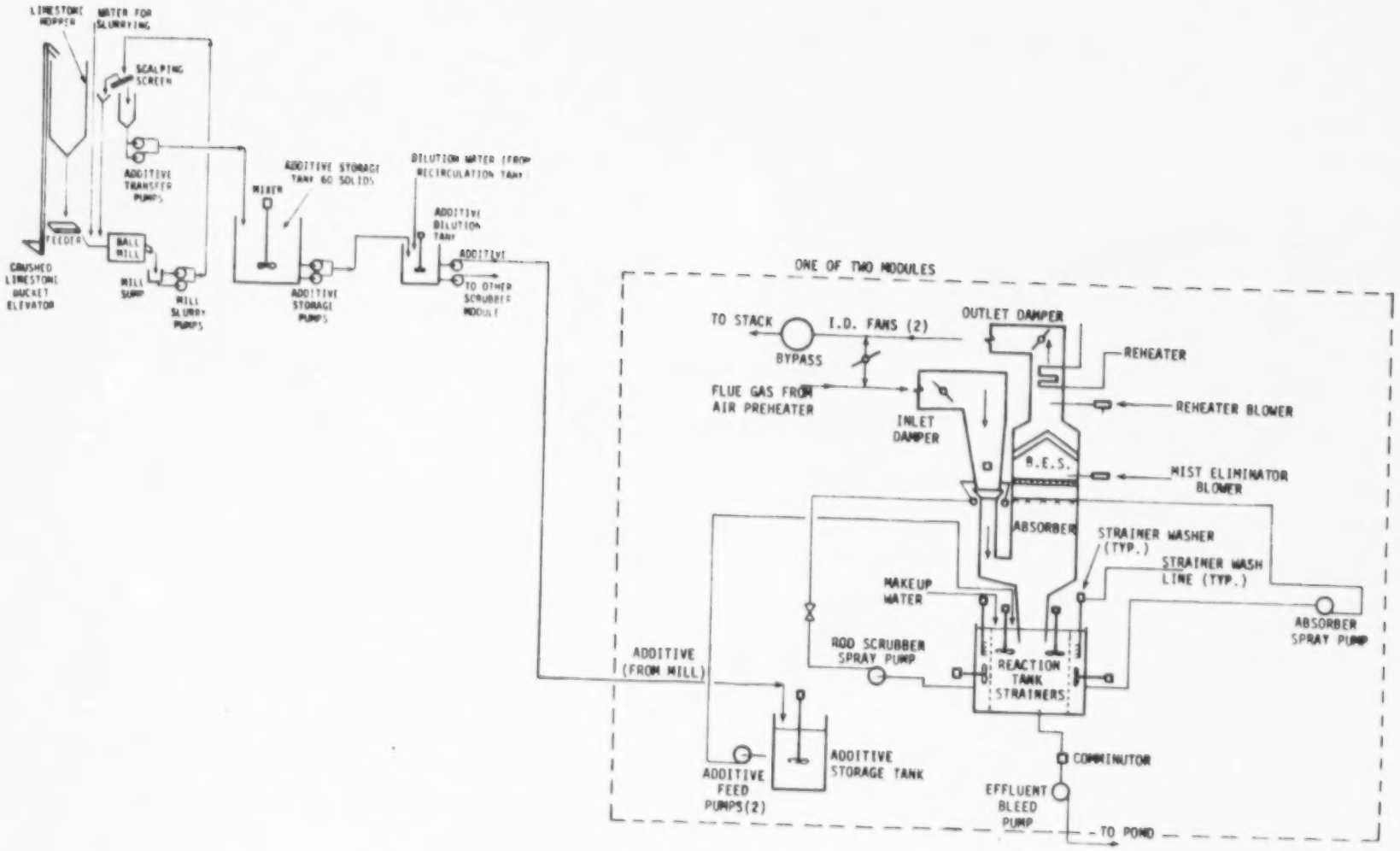
ARRANGED ALPHABETICALLY ACCORDING TO UTILITY

"SUPPLEMENTAL EDITION"

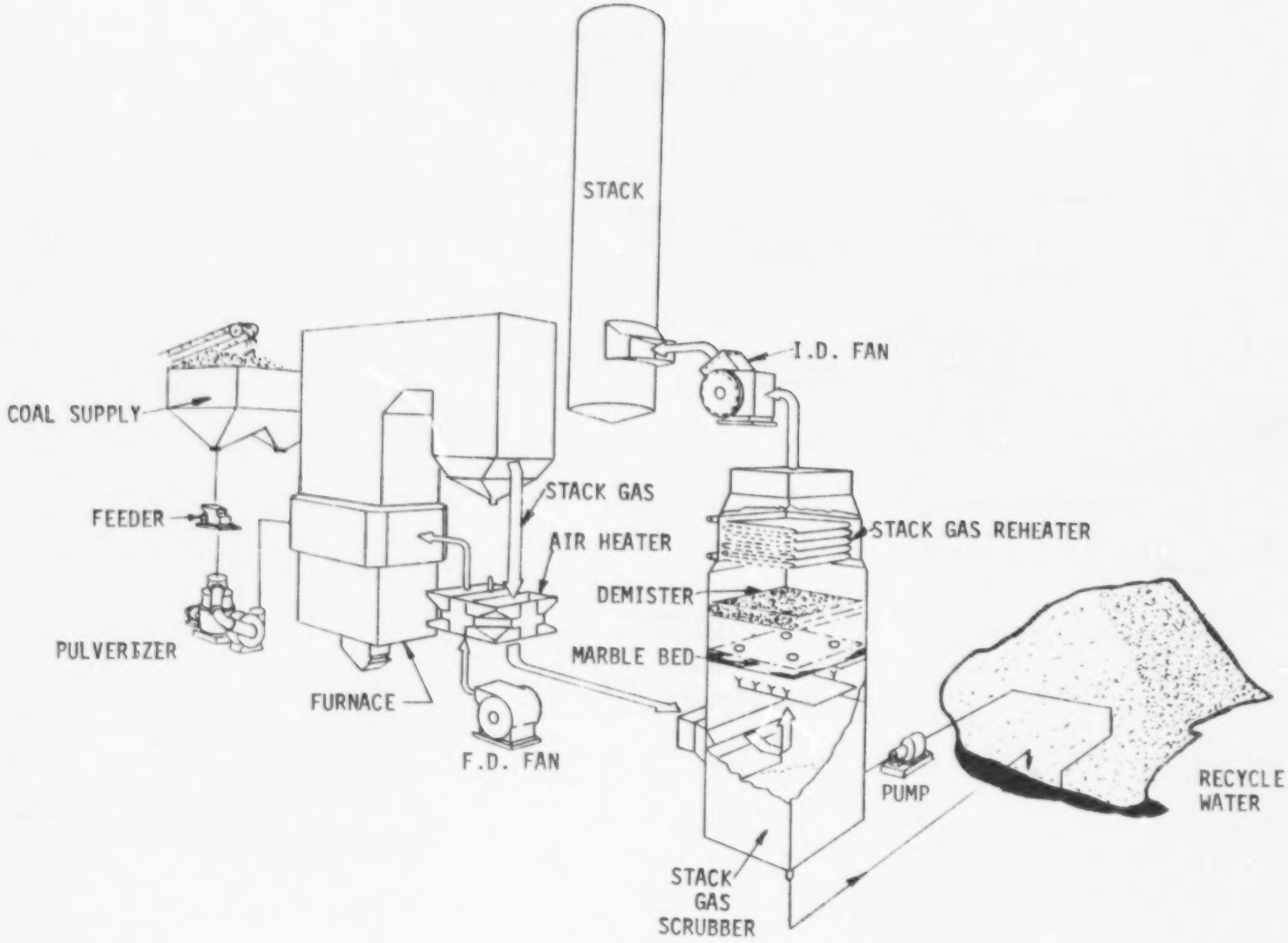
CHANGES/ADDITIONS



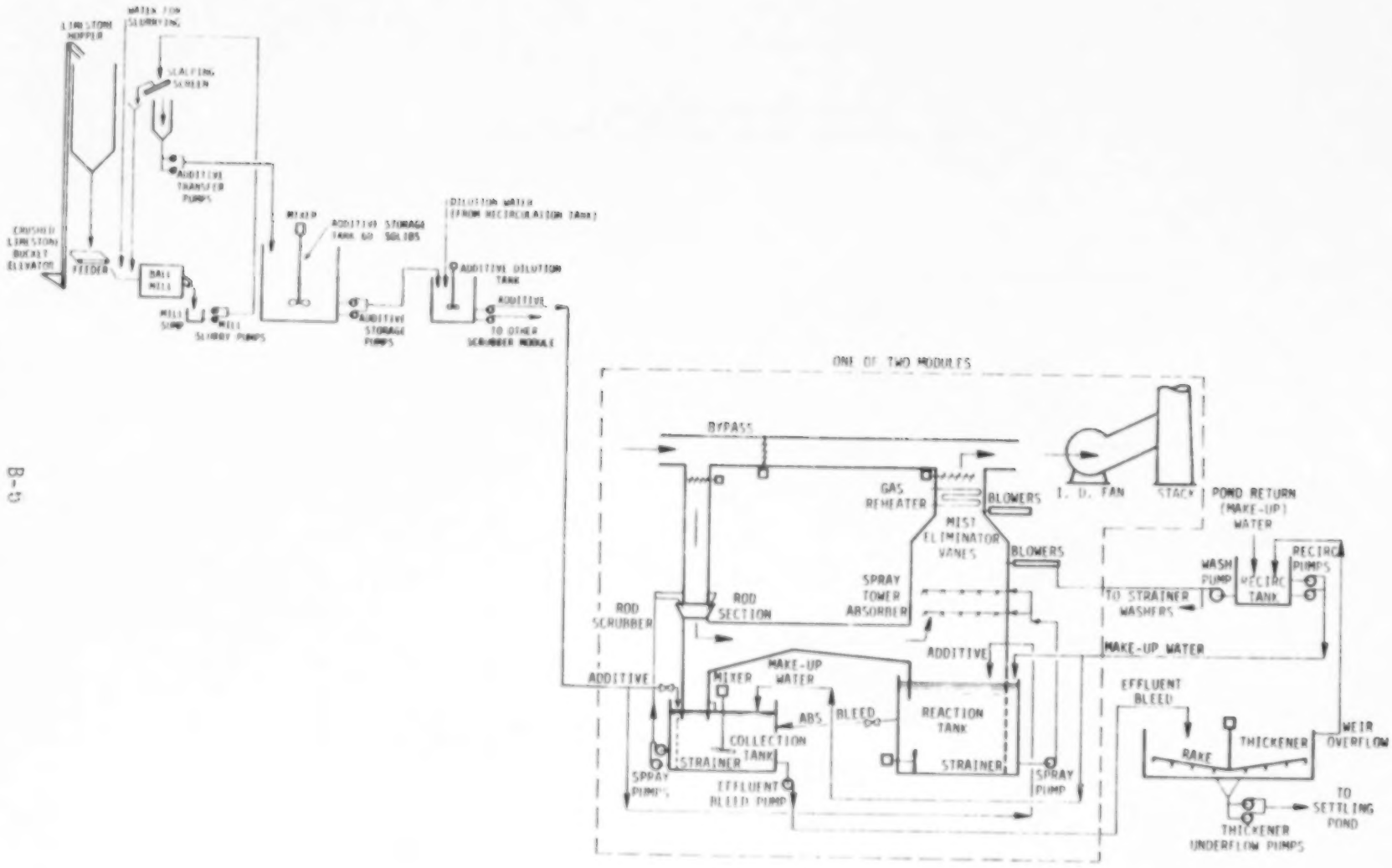
Kansas Power and Light
Original Operational FGD System at Lawrence No. 4.



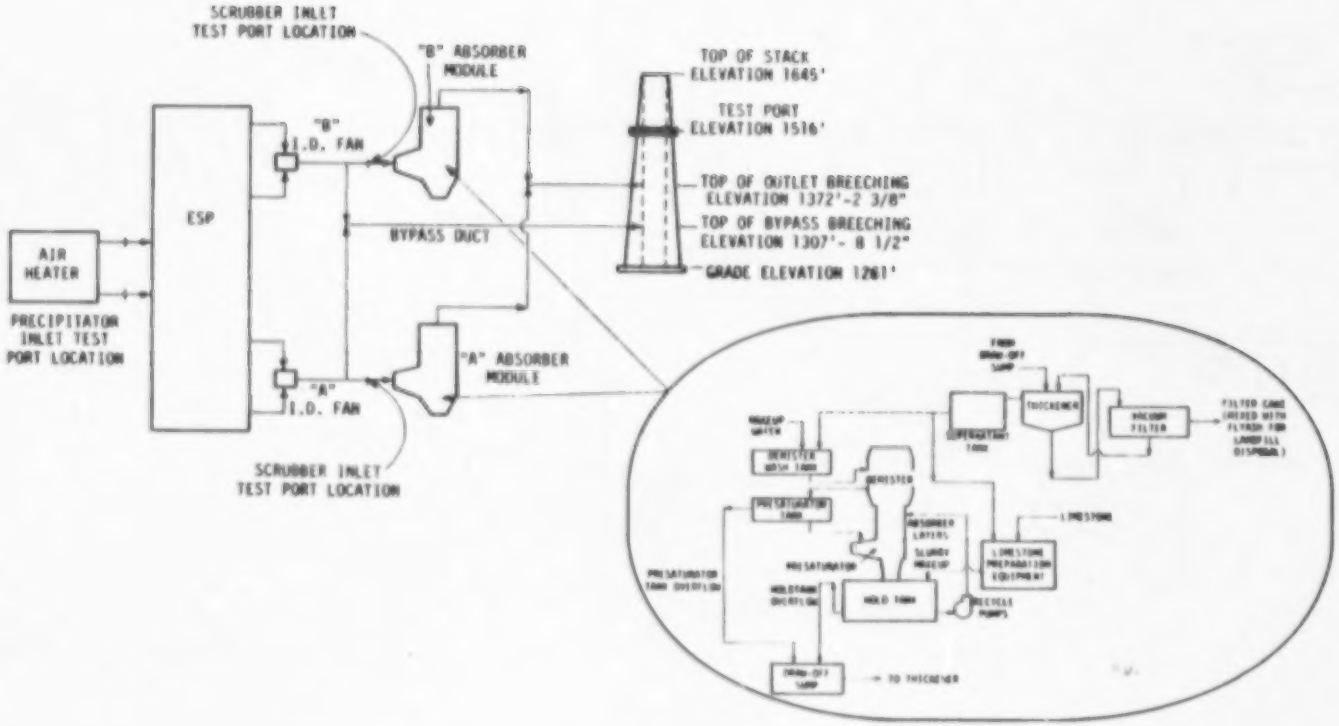
Kansas Power and Light,
Lawrence No. 4 Operational FGD System
Simplified Process Flow Diagram



Kansas Power and Light
Original FGD System Installed at Lawrence No. 5:
Simplified Process Flow Diagram.



Kansas Power and Light,
Lawrence No. 5 Operational FGD System
Simplified Process Flow Diagram



Springfield City Utilities, Southwest No. 1:
Simplified Process Diagram

APPENDIX C

DEFINITIONS

DEFINITIONS

Boiler Capacity Factor:	(kWh generation in year)/ maximum continuous generating capacity in kW x 8760 hr/yr).
Boiler Utilization Parameter:	Hours boiler operated/hours in period, expressed as a percentage.
Efficiency:	
Particulates	The actual percentage of particulates removed by the emission control system (mechanical collectors, ESP, or fabric filter and FGD) from the untreated flue gas.
SO_2	The actual percentage of SO_2 removed from the flue gas by the FGD system. Design removal efficiency values are presented for nonoperational systems for which actual removal data are not available.
FGD Viability Indexes	Several parameters have been developed to quantify the viability of FGD system technology. Various terms such as "availability," "reliability," "operability," and "utilization" are used to accurately represent the operation of any FGD system during a given period. The above-mentioned parameters are defined below and discussed briefly. The objectives of this discussion are to make the reader aware that several different definitions are being used and to select appropriate parameters that can be used for reporting purposes so that reasonably consistent comparisons can be made.

DEFINITIONS

Availability Index	Hours the FGD system is available for operation (whether operated or not) divided by hours in period, expressed as a percentage. This parameter tends to overestimate the viability of the FGD system because it does not penalize for election not to operate the system when it could have been operated. Boiler downtime may tend to increase the magnitude of the parameter because FGD failures generally cannot occur during such periods.
Reliability Index	Hours the FGD system was operated divided by the hours the FGD system was called upon to operate, expressed as a percentage. This parameter has been developed in order not to penalize the FGD system for elected outages, e.g., periods when the FGD system could have been run but was not run because of chemical shortages, lack of manpower, short duration boiler operations, etc. The main problem in using this formula is the concise determination whether or not the system was "called upon to operate" during a given time period. In addition, an undefined value can result when the FGD system is not called upon to operate for a given period (e.g., turbine or boiler outage when FGD system is available).
FGD Operability Index	Hours the FGD system was operated divided by boiler operating hours in period, expressed as a percentage. This parameter indicates the degree to which the FGD system is actually used, relative to boiler

	operating time. The parameter does not reflect the extent of exertion on the FGD system, that is, the magnitude of the parameter has little or no correlation with FGD system operating time. Also, the parameter is penalized when options are exercised not to use the FGD system in periods when the system is operable. In addition, an undefined value can result when the FGD system is not called upon to operate for a given period (e.g., turbine or boiler outage when FGD system is available).
FGD Utilization Index	Hours that the FGD system operated divided by total hours in period. This parameter is a relative stress factor for the FGD system. It is not a complete measure of FGD system viability because the parameter can be strongly influenced by conditions that are external to the FGD system (e.g., infrequent boiler operation will lower the value of the parameter although the FGD system may be highly dependable in its particular application).
FGD Status:	
Category 1	Operational - FGD system is in service removing SO_2.
Category 2	Under Construction - ground has been broken for installation of FGD system, but FGD system has not become operational.
Category 3	Planned, Contract Awarded - contract has been signed for purchase of FGD system but ground has not been broken for installation.

Category 4	Planned, Letter of Intent Signed - letter of intent has been signed, but legal contract for purchase has not been awarded.
Category 5	Planned, Requesting/Evaluating Bids - bid requests have been released but no letter of intent or contract has been issued.
Category 6	Considering only FGD Systems - an FGD system is proposed as a means to meet an SO_2 regulation.
Category 7	Considering an FGD system as well as alternative methods.
Category 8	Nonoperational - FGD system has been in service in the past but has been shut down permanently or for an extended indefinite period of time.
FGD Vendor	A firm which fabricates and supplies FGD systems, most notably the flue gas treating and ancillary equipment.
Fuel Characteristics	Type of fuel, average gross heating value in Btu/lb. average percent ash and average percent sulfur content for fuel as fired.
New	FGD unit and boiler were designed at the same time or space for addition of an FGD unit was reserved when boiler was constructed.
Nonregenerable	The SO_2 removed from the flue gas is not recovered in a usable or marketable form and resulting sulfur-bearing waste products must be disposed in an environmentally acceptable fashion.

Operational Experience	Summary of FGD status and description of current month's progress.
Process	Company name if process is patented. Generic name if several companies have similar processes.
Regulatory Class	A. New boiler constructed subject to Federal New Source Performance Standards. B. Existing boiler subject to State Standard that is more stringent than the Federal New Source Performance Standard (NSPS). C. Existing boiler subject to State Standard that is equal to or less stringent than NSPS. D. Other (unknown, undetermined).
Regenerable	The SO_2 removed from the flue gas is recovered in a usable or marketable form (e.g., sulfur, sulfuric acid, gypsum, ammonium sulfate, sodium sulfate).
Retrofit	FGD unit must be added to an existing boiler not specifically designed to accommodate FGD unit.
Sludge Disposal	Disposal method for nonregenerable systems producing sludge including: lined or unlined ponds, stabilized or unstabilized sludge, and on- or off-site disposal, disposal type (minefill, landfill, structural fill). For the regenerable systems, the form or method of sulfur recovery is provided (e.g. - molten elemental sulfur, sulfuric acid plant).

Start-up Date	Date when initial SO_2 removal began or is scheduled to begin.
Total FGD System Lost Generation Factor	The total monthly lost generation hours due to FGD train outages divided by the total monthly expected generation if the FGD trains would have been available for operation, expressed as a percentage.
Unit Cost	Capital Cost in $/kW including: SO_2 absorption and regeneration system, SO_2 recovery system, solids disposal, site improvements, land, roads, tracks, substation, engineering costs, contractors fee and interest on capital during construction. Annualized Cost in mills/kWh including fixed and variable costs. Fixed costs include: interest on capital, depreciation, insurance, taxes, and labor costs including overhead. Variable costs include: raw materials, utilities, and maintenance.
Unit Location	City and State listed in mailing address.
Unit Name	Unit identification as it appears in Electrical World - Directory of Electrical Utilities, McGraw-Hill - Current Edition - or as indicated by utility representative for installations in planning stages.
Unit Rating	Operational - Maximum continuous gross generation capacity in MW; Preoperational - maximum continuous design generation capacity in MW.

Utility Name	Name of corporation as it appears in Electrical World - Directory of Electrical Utilities, McGraw-Hill - Current Edition - as space permits.
Water Make-Up	Gallons per minute of make-up water required per MW of capacity.

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

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3. PB287214	
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15. SUPPLEMENTARY NOTES: EPA project officers are N. Kaplan (IERL-RTP, 919/541-2556) and J. C. Herlihy (DSSE, 202/755-8137).

16. ABSTRACT: The report is an updated supplement to EPA-600/7-78-051a and should be used in conjunction with it. It presents a survey of utility flue gas desulfurization (FGD) systems in the U.S., summarizing information contributed by the utility industry, process suppliers, regulatory agencies, and consulting engineering firms. Systems are tabulated alphabetically, by development status (operational, under construction, in planning stages, or terminated operations), by utility company, by process supplier, by process, by waste disposal practice, and by regulatory class. It presents data on system design, fuel sulfur content, operating history, and actual performance. It discusses problems and solutions associated with the boilers and FGD systems. Process flow diagrams and FGD system economic data are appended to the report.

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17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Pollution	Pollution Control	13B
Flue Gases	Stationary Sources	21B
Desulfurization	Utility Boilers	07A, 07D
Electric Utilities		
Waste Disposal		15E
Boilers		13A
Maintenance		

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